SPECIFICATIONS

FOR

NEW BRANCH OFFICE

JOHNSON CITY BRANCH

622 N. Nugent Avenue
Johnson City, Texas 78636

FOR

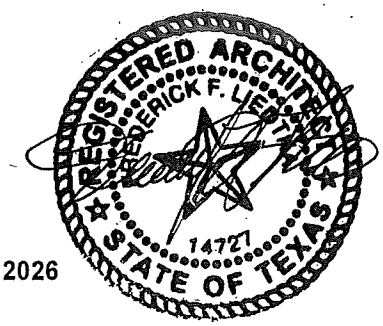
SECURITY STATE BANK AND TRUST

201 West Main
Fredericksburg, Texas 78624

ARCHITECT:

CHESNEY MORALES PARTNERS, INC.
4901 Broadway Suite 250
San Antonio, Texas 78209
210.828.9481
210.828.9719 (Fax)

PROJECT NUMBER: 2606
DATE: OCTOBER 5, 2026



OCTOBER 5, 2026

CONSULTANTS

ARCHITECT:

CHESNEY MORALES PARTNERS, INC.
4901 Broadway Suite 250
San Antonio, Texas 78209
210.828-9481
210.828-9719 (Fax)

MECHANICAL / ELECTRICAL / PLUMBING ENGINEER:

EEA CONSULTING ENGINEERS
500 N. Loop E 1604 East Suite 220
San Antonio, Texas 78232
210.955.0030
(Fax)

STRUCTURAL ENGINEER:

AXIS STRUCTURAL
1045 Central Parkway N. Suite 101
Fredericksburg, Texas 78232
210.824-2908
210.496-9330 (Fax)

CIVIL ENGINEER:

CORNETT ENGINEERNG
1174 Funf Kinder
Fredericksburg, Texas 78624
210.213.1195
(Fax)

LANDSCAPE ARCHITECT:

C2 LANDSCAPE, INC.
317 Lexington Suite 1
San Antonio, Texas 78215
210.269.5354
(No Fax Number)

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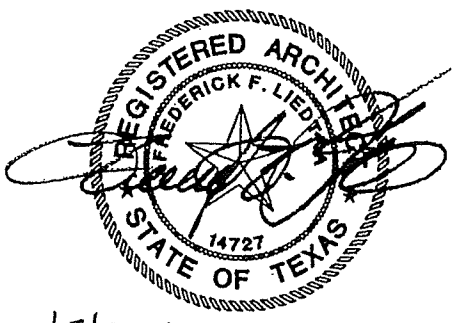
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10/5/2026

000001

INVITATION TO BID

A NEW BRANCH OFFICE

JOHNSON CITY BRANCH

622 N Nugent Avenue
Johnson City, Texas 78636

for

SECURITY STATE BANK AND TRUST

It is the intent of Security State Bank and Trust to construct a *New Branch Office located at 622 N. Nugent Avenue, Johnson City, Texas 78636* as described on the drawings and in the specifications. Construction work will involve architectural, mechanical, plumbing, electrical and site work. Without force and effort upon the contract, the work can briefly be described as follows:

New construction including but not necessarily limited to site work and grading , utilities, selective demolition of pavement, pavement curbs and walks concrete, structural steel, cold formed framing and metals; carpentry, wood work, and millwork; firestopping, thermal and moisture protection, sealants, roofing systems, prefinished metal panel, doors and frames, door hardware, glazing, gypsum board, tile, acoustic ceiling, resilient flooring, paints, interior and exterior signage signs, fire extinguishers; window treatment, air conditioning, plumbing; electrical, lighting, data, and power distribution, landscape, irrigations, and fencing .

Invited contractors are to submit sealed bids for this project. Bids will be based on single lump sum prime contract to include all documents prepared by Chesney Morales Partners, Inc., 4901 Broadway, Suite 250, San Antonio, Texas 78209, (210) 828-9481, (210) 828-9719 (Fax). The bids shall be e-mailed to Security State Bank and Trust, 201 W. Main, Fredericksburg, Texas 78624:
Attention: Caleb Elrod at celrod@ssbtexas.com. Bids will be received until Tuesday, October 22, 2026 at 2:00 p.m. Any bid received after 2:00 p.m. will be returned unopened. Bids will be privately opened. Bidders are to provide a complete breakdown of the bidding documents corresponding to the format as included in the project manual.
Invited Bidders will be sent by email a link with the Bid documents. Physical copy of the Bidding documents may be obtained upon request from Chesney Morales Partners, Inc., 4901 Broadway, Suite 250, San Antonio, Texas 78209.

All questions prior to bidding must be submitted in writing to Frederick "Tex" Liedtka tliedtka@chesneymorales.com and Megan Julian mjulian@chesneymorales.com by 5:00 p.m. on Monday, October 12, 2026. Questions will be responded to by the Architect by, Friday, October 16, 2026 in Addendum format. If the questions were not addressed in a written response, the Bidders are still obligated to include pricing in their proposal to include the items in question.

The Architect has submitted the plans for permitting review. All Building Permit costs will be paid by the Owner

The Architect has submitted the plans for permitting review. All Building Permit costs will be paid by the Owner

No unlawful discrimination will be made against bidders, vendors, or contractors, because of race, color, religion, sex, age, national origin, physical disability/handicap, or mental disability/handicap.

The successful Bidder will be selected based on cost and time to complete the project.

Security State Bank and Trust reserves the right to reject any and all bids and to waive any informalities.

END OF SECTION 000001

SECTION 000003

BID FORM

A NEW BRANCH OFFICE

JOHNSON CITY BRANCH

622 N Nugent Avenue
Johnson City, Texas 78636

For

Security State Bank and Trust

DATE:

PROPOSAL OF:

(NAME OF BIDDER)

TO: SECURITY STATE BANK AND TRUST

GENTLEMEN:

In compliance with your invitation to bid the subject Project, the undersigned has examined the Project Manual and Specifications, Drawings, Addenda, and related documents as prepared by Chesney Morales Partners, Inc., 4901 Broadway, Suite 250, San Antonio, Texas 78209, visited the site of the proposed work, and are familiar with all of the conditions, materials, services, equipment, and appliances required in connection with, or incidental to, the proposed Project.

BASE BID:

To furnish all materials, equipment, implements, supplies, tools, and facilities, and to perform all labor and services necessary or required, in connection with, or normally incidental to the completion of all work, according to the listed Bidding Documents for the lump sum of:

BID: _____
(written)

DOLLARS ($): _____
(figures)

(Amount of bid to show in both words and figures. In case of discrepancy between the two, the words will govern.)

ALTERNATES:

ALTERNATE NO. 1

1. Base Bid: No performance and payment bonds are to be included in the base bid.

2. Alternate: The Contractor is to provide an ADDITIVE alternate price for providing performance and payment bonds.

ADD the sum of _____ ($_____)
written figures

ALTERNATE NO. 2

1. Base Bid: Scope of work is to include walls , storefront units scheduled as K and J, Doors 105, 112, 118, 119 and 120 in the base bid.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price for in lieu of constructing the wall below 9'-0" AFF in the areas indicated as Alternate 2 in the floor plans or storefront units scheduled as K and J, or Doors 105, 112, 118, 119 and 120, to provide a finished cased opening and jambs with blocking to support the installation of modular glass wall panels and doors system by owner's furniture vendor.

DEDUCT the sum of _____ ($_____)
written figures

ALTERNATE NO. 3

1. Base Bid: Provide color Millwork Teller Desk as detailed in the documents.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price eliminate the teller desk in its entirety.

DEDUCT the sum of _____ ($_____)
written figures

ALTERNATE NO. 4

2. Base Bid: Provide color Millwork Check Desk as detailed in the documents.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price eliminate the Check Desk in its entirety.

DEDUCT the sum of_____ ($_____)
written figures

ADDENDA

The undersigned acknowledges receipt of Addendum Nos. _____ to the Bidding Documents. All of the provisions and requirements of the Addenda have been taken into consideration in preparation of the foregoing proposals.

TIME OF COMPLETION:

The undersigned agrees to commence work under this contract upon a written "Notice To Proceed" from the Owner and to complete the Project fully within _____ Calendar Days.

GENERAL CONTRACTOR PERSONNEL

PROJECT MANAGER _____

PROJECT SUPERINTENDENT _____

PROJECT ENGINEER _____

EXPIRATION

This bid shall remain in effect for a period of Ninety (90) days from the date of submission.

_____
CONTRACTOR

_____
BY

_____
TITLE

_____
BUSINESS ADDRESS

_____
(Area Code + Telephone Number)

(Seal if Bidder is a corporation)

END OF SECTION 000003

SECTION 010001 - GENERAL REQUIREMENTS

SPECIAL CONDITIONS

ELIMINATION OF ASBESTOS

The Owner shall require the General Contractor to ensure that no asbestos in any form is incorporated into the work. The Contractor shall take steps as necessary to inform all suppliers of materials and products; subcontractors and others associated with this work of this requirement.

In the event that asbestos containing products are discovered to have been installed under this contract at any time during construction or at any subsequent time within a period enforceable by law Contractor shall be required to remove the material or product or equipment and replace it with a comparable asbestos free material or product or equipment at no cost to the Owner.

ACCIDENT PREVENTION

The Contractor shall take proper safety and health precautions to protect the work the workers, the public, and the property of others. He shall observe the provisions related thereto of applicable laws and building and construction codes and also of the Manual of Accident Prevention in Construction published by the Associated General Contractors of America to the extent that such provisions are not in contravention of applicable law.

TRENCH EXCAVATION PROTECTION

Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety equipment consultant, if any, shall review these plans and any available geotechnical information add the anticipated installation site(s) within the project work area in order to develop the contractor's plans to implement the project described in the contract documents. The Contractor's plans shall provide for adequate trench safety systems that comply with the minimum OSHA standards for trench excavations. Specifically, Contractor and/or Contractor's independently retained employ or safety consultant shall develop and implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

Construction Methods: Trench Excavation protection shall be accomplished as required by the provisions of; Part 1926, Subpart P-Excavations, Trenching and Shoring of the Occupational Safety and Health Administration Standards and Interpretations.

MATERIALS AND WORKMANSHIP

Unless specified to the contrary all materials of construction shall be new and of the best of the kinds and grades specified and all workmanship shall be up to the best recognized standards known to the various trades.

PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

No performance or payments bonds will be required for this project. All obligations arising under any requirement for compliance with the Texas Property Code as amended shall be the responsibility of the Contractor to assure the no liens or claims are placed upon the property or the improvements made.

The Contractor is to submit an original notarized "Affidavit and Partial Release of Lien" from General Contractor, all Sub-contractors, suppliers of materials and equipment and all performers of work, labor or services or persons that otherwise that have a right to assert liens on encumbrances against the Owner arising in any manner out of the performance of the Contract with each application of payment. At project close-out the Contractor is to submit "Contractor's Affidavit of Release of Liens AIA Document G706A – 1994, before final Payment.

SUBSTITUTIONS

NO SUBSTITUTIONS WILL BE ALLOWED.

Materials in the Specifications may be followed by the words "or an approved equaled." In these cases, wherever the name or brand of a manufacturer's article is specified it is used as a measure of quality, and utility or a standard. If after a construction contract is awarded, the Contractor prefers to use any other brand of manufacturer of same quality, appearance, and utility to that specified, he shall request substitution as provided below, within thirty (30) calendar days after date of the agreement, Architect shall approve or disapprove the request for substitution and his decision shall be final. Unless substitutions are requested within the time stated above and as provided below, no deviation from the specification shall be allowed.

Requests for substitutions shall only be considered if Contractor submits the following:

1. List of items to be replaced and the substitution for each item, clearly identifying each by name and model number along with complete technical data including drawings, complete performance specifications, test data, samples and performance tests of the article proposed for substitution. Submit additional information if required by Architect.

2. Statement by Contractor that the proposed substitution is in full compliance with the Contract documents and applicable colder.

3 Contractor shall be responsible for any effect upon related Work in the Project of any substitution and shall pay any additional costs generated by any substitutions, including additional Architect's fees, if any, made necessary thereby.

Liens: It is directly understood that by virtue of this contract. no mechanic, contractor, material man, artisan, or laborer, whether skilled or unskilled shall ever in any manner, have, claim, or acquire, any lien upon the house, building, or any of the improvements of whatever nature or kind so erected or to be erected by virtue of the contract. not upon any of the land upon which said house or any of the improvements are so erected, built or situated.

Payroll Reports: The Contractor, shall keep cause to be kept and shall cause each of his Subcontractors to keep or cause to be kept an accurate record showing the names and occupations of all laborers, workmen and mechanics employed in connection with the Project and showing also the actual per diem wages paid to each of such workers, which record shall be open at all reasonable hours to the inspection of the Owner, its officers, and agents.

PRE-CONSTUCTION CONFERENCE

Before any work is started the General Contractor shall meet with the Architect and the Owner to discuss the methods of procedure to be followed by the Contractor.

SPECIFICATIONS:

The Specifications are addressed to the Contractor and his work regardless of the extent of the subdivision of this work by subcontracts trades or otherwise.

Subdivision: Subheadings of the Specifications are introduced only for convenience of reference and not for limitation of subject matter in the various subdivisions. No allowance will be made for Contractor's failure to include any item of work on account of limitation of subcontracts or purchases by specification subheading.

Relation of Divisions: Divisions 02 through 33 apply to the various construction constituents of the work. Division 01 contains general provisions which apply in some or all parts to every Section of Divisions 02 through 33, No allowance will be made for contractor's failure to apply all appropriate provisions of Division 01 to any and every portion of the work included whether or not reference to Division 01 is made.

Language: Specifications Divisions 01 through 33, written in direct address rather than indirect address, are so written for brevity and simplicity and do not constitute direction or instruction of Contractor as a means of accomplishment. Rather, the intent of the language is to describe and define the systems and their incorporated materials and equipment, and requirements of their fabrication, function and/or installation and completion in terms of the trades and otherwise as required for understanding.

DRAWINGS:

Diagrammatic: The Drawings are diagrammatic and intended to aid in defining the extent and relation of the various parts of the work to each other and to the whole.

Enlargement: Details are included to further define the parts in conjunction with the specifications to the extent required for accomplishment of the contract intent. No allowance will be made for Contractor's failure to incorporate all usual and appropriate required shop and field work and incidentals not shown, but necessary, for accomplishment of the Intent defined.

RELATIONS OF THE DOCUMENTS:

Complementary: The Drawings and Specifications are complementary, and anything included in one but not the other, shall be included as if included completely in both. In case of conflict between the documents or within either, the Architect shall determine the intent.

Cost Basis: In case of conflicts, the requirement defining the greater quantity, and/or the higher quality shall govern, unless otherwise indicated.

RECORD DRAWINGS

The Contractor shall include in his bid the costs of maintaining a set of the original bidding documents: as required and at contractor's expense, as follows:

1. lf the Contractor shall elect to vary from the contract Documents, and secures prior approval of the Architect, for any phase of tile Work, he shall record in a neat readable manner, all such variances on the reproducible drawings furnished.

2. The Contractor shall record any variance between the actual construction and the original Contract Documents including changes reburied by Architect's Supplementary Instructions, Change Orders and any materials or equipment substitutions.

3. For plumbing; heating, ventilating, and air-conditioning; electrical; and fire protection work; Record Drawings shall be maintained by the Contractor as the Work progresses and as follows:

    a. All deviations from the sizes, locations and from all other features of all installations shown in contract Documents shall be recorded.
    b. In addition, it shall be possible, using these drawings, to correctly and easily locate, identify and establish sizes of all piping, directions, and the like, as well as all other features of Work which will be concealed underground and/or in the finished building.
        1) Locations of underground Work shall be established by dimensions to column lines or wails, locating all turns, etc. and by properly referenced centerline or invert elevations and rates of fall.
        2) For work concealed in the building sufficient information shall be given so it can be located with reasonable accuracy and ease. In some cases, this may be by dimensions, in others it may be sufficient to illustrate the work on the drawings in relation to the spaces in the building near which it was actually installed.

4. The following requirements apply to all record drawings:

    a. They shall be maintained at the Contractor's expense.
    b. All such drawings shall be done carefully and neatly by a competent draftsman and in a form approved by the Architect.
    c. Additional drawings shall be provided as necessary for clarification.

d. They shall be kept up to date during the entire course of the Work and shall be available upon request for examination by the Architect and, when necessary, to establish clearances for other parts of the Work.
e. The record drawings shall be returned to the Architect upon completion of the Work and are subject to the approval of the Architect.

Layout: Prior to commencement of excavation the Contractor shall establish benchmarks at strategic locations surrounding the construction site. Benchmarks shall be in sufficient number and locations to ensure monitoring and control throughout the total construction period. Should the need arise for additional benchmarks or controls during construction, these also shall be established by the Contractor at his cost. Establishment of these benchmarks and layout of the project shall be done by an experienced and competent instrument man.

Measurements: Before ordering any material or doing any work; the Contractor shall verify all measurements at the building and be responsible for the difference between actual dimensions and the measurements indicated on the drawings. Any differences found shall be submitted to the Architect for instructions before proceeding with the work.

Transportation and Handling: Methods of crating, transportation and handling of materials and equipment, on and off the site, shall be such as to ensure their ultimate installation in undamaged and perfect working condition.

Construction Safety Requirements: All work shall be done in accordance with applicable Standards, Requirements, and local governing codes.

INSPECTIONS

By Regulatory Agencies: Notify local authority to perform inspections required by local governing ordnances and submit certificates of results of inspections to Architects.

EQUIPMENT BASE AND ROOF OPENINGS

Equipment bases, foundation and roof opening sizes and locations as shown on the Drawings are approximate.

Before constructing equipment bases, foundations and roof openings, Contractor shall verify locations, sizes and number and type of anchor bolts against the actual equipment to be installed.

SUPERVISION

ON SITE CONSTRUCTION SUPERVISION: The Owner must approve the site foreman. The Foreman that begins the job is to remain on the job for the duration of the contract and should not be released from the job responsibilities until agreed upon by the Owner. Any interim substitution must be reviewed and agreed on by the Owner. The General Contractor shall continually supervise work either in person or though an acceptable foreman who shall be at the jobsite at all times during performances of any work. Foreman shall have full authority to act for Contractor he represents and shall be authorized to receive instructions from Architect.

There shall be at least one General Foreman whose expertise includes the shell building, site work, utilities and general rough-in of systems.

APPROVAL OF WORKING SURFACE

Beginning of work by any Contractor or subcontractor shall constitute acceptance of the previous work.

LOADS AND STRESSES FROM CONSTRUCTION OPERATIONS

The Contractor shall have full responsibility for preventing over stress of any and all parts of the structure during construction operations.

Provide all temporary supports, bracing, and connections necessary to assure safety and stability of all work in place and to prevent the over stress of any part thereof.

WORK UNDERSEPARATE CONTRACT

The General Contractor shall coordinate: all work with the installation of equipment which might be provided under a separate contract. The General Contractor shall coordinate and allow the equipment installer access to and use of temporary services as necessary for the proper installation of the equipment.

END OF SECTION 010001

SECTION 010070 - PROVISIONS FOR THE HANDICAPPED

PART 1 GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

GENERAL REQUIREMENTS:

Provisions for the handicapped shall be made in full compliance with the requirements of Americans with Disabilities Act (ADA) of 1990 and with the requirements of the Texas Accessibility Standards (TAS), for the purpose of administering the Architectural Barriers Act, Article 9102, Texas Civil Statutes.

The Department of Justice published revised regulations of the Americans with Disabilities Act of 1990 "ADA" in the *Federal Register* on September 15, 2010. These regulations adopted revised, enforceable accessibility standards called the 2010 ADA Standards for Accessible Design "2010 Standards" or "Standards". The 2010 Standards set minimum requirements – both scoping and technical -- for newly designed and constructed or altered State and local government facilities, public accommodations, and commercial facilities to be readily accessible to and usable by individuals with disabilities.

State and local government facilities must follow the requirements of the 2010 Standards, including both the Title II regulations at 28 CFR 35.151; and the 2004 ADAAG at 36 CFR part 1191, appendices B and D. In a few instances the requirements between the two differ; Therefore, requirements of 28 CFR 35.151 prevail.

COMPLIANCE DATE: 2010 ADA STANDARDS AND 2012 TEXAS ACCESSIBILITY STANDARDS

If the start date for permit is on or after March 15, 2012, all newly constructed or altered State and local government facilities must comply with the 2010 Standards. Before that date, the 1991 Standards (without the elevator exemption), the UFAS, or the 2010 Standards may be used for such projects when the start of construction commences on or after September 15, 2010.

The 2010 Standards are to be applied to projects in the State of Texas as indicated in the 2012 Texas Accessibility Standards (TAS) during the design, construction, additions to, and alteration of sites, facilities, buildings, and elements to the extent required by regulations issued by the Texas Department of Licensing and Regulation under the authority of Texas Government Code, Chapter 469. These standards are intended to be consistent to those contained in the 2010 Standards of Accessible Design. The date of compliance is March 15, 2012.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

The following is a partial listing of the accessibility standards which are included in The Requirements.

In the event of a discrepancy between any dimensions on the drawings and any dimensions listed herein, the dimensions listed herein shall take precedence. The Contractor shall consult with the Architect upon discovery of any such discrepancy and corrections shall be made at the expense of the Contractor, with no additional cost to the Owner. Except in the event of such a discrepancy, all items shall be installed at the mounting heights indicated on the drawings.

MOUNTING HEIGHTS:

HANDRAILS:

RAMPS	
Men and Women	34" - 38" above ramp
STAIRS	
Men and Women	34" - 38" above nosings

DRINKING FOUNTAINS:

Low	27" knee space, 36" to spout
High	40" - 42" to spout

HAND DRYERS AND PAPER TOWEL DISPENSERS:

FRONTAL APPROACH	48" maximum to control
Men and Women	15" minimum to control
SIDE APPROACH:	
Men and Women	48" maximum to control 15" minimum to control

WATER CLOSETS:

Men and Women	17" - 19" to top of seat
	NOTE: Flush valves handle must be on wide side of stall/room
Men and Women	16" - 18" from wall or toilet partition. Cannot exceed range noted. Center at 17"

URINALS:	
Men	17" maximum to basin opening
FLUSH CONTROLS:	
WATER CLOSETS:	
Men and Women	44" maximum to control
URINALS:	
Men	44" maximum to control
GRAB BARS:	
Men and Women	33" - 36" to center
TOILET PARTITION HEIGHT:	9" minimum to bottom
LAVATORIES:	
Men and Women	29" min. knee clearance at apron 34" maximum to top
MIRRORS:	
Men and Women	40" maximum to bottom of reflective surface
TOILET PAPER DISPENSER:	15” min, 48” max to highest operable part above finished floor, and if above 36” AFF, then 12” min above grab bar.
LOCKERS	15” min, 48” max to highest operable part above finished floor.
TELEPHONES:	
FRONTAL APPROACH:	
Men and Women	48" max to top device

SIDE APPROACH:

Men and Women	48" max to top device

ELECTRICAL AND COMMUNICATION SYSTEMS RECEPTACLES:

15" minimum

SWITCHES, CONTROLS AND ALARMS:

FRONTAL APPROACH:

Men and Women	48" maximum 15" minimum

SIDE APPROACH:

Men and Women	48" maximum 9" minimum

AUDIO VISUAL FIRE ALARM SIGNAL:	80" to center, mount on ceiling
ROOM IDENTIFICATION SIGNAGE:	48” to 60” AFF to tactile characters, measured from the baseline of the highest tactile character
PARKING IDENTIFICATION SIGNAGE:	Graphic symbols between 60" minimum above paving

DOOR HANDLES, PULLS, LOCKS ETC.:

Height	48” maximum

DOOR OPERATING FORCE:

Interior Hinged Doors	5 pounds of force
Exterior Hinged Doors	Reserved

DOOR THRESHOLD:

Height at sliding doors	1/2" maximum
Height at all other doors	1/2" maximum
Bevel	1:2 maximum slope

PROTRUDING OBJECT:

Wall mounted 27" - 80" High to bottom	4" maximum projection
Wall mounted Less than 27" High to bottom	No maximum projection
Post or Pylon mounted 27" - 80" High to bottom	12" maximum projection
Post mounted 2 posts, greater than 12" apart	27" maximum clearance below
Ceiling mounted	80 "minimum clearance

PASSENGER ELEVATORS:

Hall Call Buttons	42" to center
Car Control Buttons:	
FRONTAL APPROACH	
Men and Women	48" maximum
SIDE APPROACH	
Men and Women	48" maximum
Hall Lanterns	72" minimum
Raised Floor Designated on Jambs	60" to center
Obstruction Sensors	5" - 29" high
Emergency Car Controls	35" minimum to center
Emergency Communications Devices	
Men and Women	48" maximum

PLATFORM LIFTS:

Controls:	24" - 48" above platform

TABLES AND WORK SURFACE:

Men and Women	27" minimum knee clearance 28" - 34" to top

BATHROOMS, BATHING FACILITIES AND SHOWERS:

Bathtubs	
Seat	
Men and Women	At top of tub
Grab Bars	
Men and Women	
Upper bar	33" - 36" above floor
Lower bar	9" above top of tub
Hand Held Shower Mount	
Men and Women	48" maximum
Shower Stalls	
Seat	
Men and Women	17" - 19" above stall floor
Grab bars	
Men and Women	33" - 36" above stall floor
Controls - Frontal Approach	
Men and Women	48" above stall floor
Controls - Side Approach	
Men and Women	48" above stall floor

RESTAURANTS AND CAFETERIAS:

Service counter	28" to 34"
Tray slide	
Men and Women	34" maximum
Self-Serve Shelves with maximum height of 48" (front) or 48" (side)	50%

BUSINESS AND MERCANTILE:

Sales counters	36" maximum (x 36" min. length)
Check Out Aisles	38" maximum to top 40" maximum to lip
Dressing Room Benches	17" - 19" above floor

LIBRARIES:

Card catalogues	48" maximum
Book stacks	no maximum height

AUTOMATED TELLER MACHINES:

FRONTAL APPROACH	48" maximum
PARALLEL APPROACH	48" maximum

SLOPES ALONG ROUTES ACCESSIBLE BY THE HANDICAPPED:

WALKWAYS:

Cross slopes	1:50 (2.0%) maximum
Running slope	1:20 (5.0%) maximum

LANDINGS:

Cross Slopes	1:50 (2.0%) maximum (Measured in any direction)
Running Slope	Level

RAMPS:

Cross slope	1:50 (2.0%) maximum
Running slope	
3" rise (existing facilities only)	1:12 (8.3%) maximum
6" rise (existing facilities only)	1:12 (8.3%) maximum
All new construction	1:12 (8.3%) maximum

FLOOR LEVEL CHANGES:

Without edge treatment	1/4" maximum
With 1:2 maximum Slope	1/2" maximum

CARPET PILE HEIGHT: 1/2" maximum

END OF SECTION 010070

SECTION 000002-B SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINITIONS

Add the following:

1.10	The Project Is:	A NEW BRANCH 622 N Nugent Avenue Johnson City, Texas 78636
1.11	The Owner Is:	Security State Bank and Trust 201 W. Main Fredericksburg, Texas 78624
1.12	The Architect is:	CHESNEY MORALES PARTNERS, INC. 4901 Broadway Suite 250 San Antonio, Texas 78209

ARTICLE 3 - BIDDING DOCUMENTS

3.1 Copies; Delete paragraph 3.1.1 in its entirety and add the following:

3.1.1 Bidders may obtain complete sets of bidding documents from the issuing office designated in the Invitation To Bid. Bidding documents may be examined at the Architect's office located at: 4901 Broadway Suite 250, San Antonio, Texas 78209.

Add the Following:

3.24 Each bidder shall be responsible for examination of the project site, and adjacent property and familiarizing himself with existing conditions before he prepares and submits his Proposal. After investigating the project site and comparing the Drawings and Specifications with the existing conditions, the bidder shall immediately notify the Architect of any conditions for which requirements of labor and material are not clear, or about which there is any question regarding the extent of the work involved.

3.25 Should the successful Bidder fail to make the required investigation and should a question arise later as to the extent of the work involved in any particular case, then the decision shall be made by the Owner with recommendations by the Architect as to the proper interpretation of the Specifications and Drawings without additional cost to the Owner.

3.26 It is understood that full and complete allowance for conditions under which the Contractor will be required to operate, or that will in any manner affect work under this Contract, is to be included in the Bidder's Proposal.

3.27 Notify Architect and/or Engineer, in writing, at least seven (7) days prior to scheduled Bid Opening date of discrepancies, ambiguities or omissions found in the Specifications or Drawings or if further information or interpretation is required.

3.27.1 Answers shall be given in writing to all Bidders in Addendum form. All provisions and requirements of such addenda shall supersede or modify affected portions of the Specifications or Drawings.

3.5 Bidders Qualifications (General Contractor)
Bidders shall satisfy the following criteria for consideration as a Prime Contractor.

.1 The Bidder shall be financially sound and able to provide the bonds as specified in the Supplementary General Conditions.

.2 The bidder must have completed Three (3) or more projects within the past five (5) years of which the contract was as large or larger (monetary) than this project.

.3 The bidder must have completed three (3) or more similar projects within the past seven (7) years of which the contract was as large or larger (monetary) than this project.

.4 The bidder's proposed project manager and superintendent must have experience of a minimum of three (3) similar projects of scope and size similar to this project.

3.6 Sub-Tier Bidders Qualifications

3.6.1 Sub-Tier Bidders for mechanical, plumbing, electrical, drywall, steel erection, roofing, and fire protection shall satisfy the following criteria for consideration as a sub-contractor. The Bidder shall verify that each sub-bidder meets these qualifications prior to accepting the sub-bid.

.1 The sub-tier bidder shall be financially sound and able to provide performance and payment bonds as specified in the Supplementary General Conditions.

.2 The sub-tier bidder must have completed five (5) or more projects within the past (5) years which subcontract was a large or larger (monetary) than this Project.

.3 The sub-tier bidder must have completed three (3) or more similar projects within the past seven (7) years which subcontract was a large or larger (monetary) than this Project.

.4 The sub-tier bidder's proposed project manager or superintendent must have experience on a minimum of three (3) similar projects of scope and size similar to this project.

Article 4 - BIDDING PROCEDURES

Add the following:

4.1.8 The Bidder is required to complete the project in the number of calendar days indicated in the Time of Completion section on the Bid Form for ordering, delivering and installing all portions of the Work of the Project.

4.1.9 Add the following:

4.1.10 The bidder is required to submit with his bid, AIA Document A305 - Contractor's Qualification Statement, as included in these documents. A current financial statement is also to be submitted within twenty-four (24) hours of bid.

4.2 Bid Security: Delete this article in its entirety and add nothing.

4.25 NOT USED

4.26 The Bidder (Contractor) shall give all notices required for proper Inspections, etc., as required for the proper execution of the work. The Contractor shall verify with the various utility service companies required for this project and shall provide, complete in all respects, all required utility extensions together with applicable meters and shall pay all costs and fees required by the Work of the project. All costs for fees, licenses, utility extensions, inspections, etc., shall be included in the Contractor's bid and paid by the Contractor.

4.3 **SUBMISSION** OF BIDS:

Delete the last sentence and ADD back the following:

4.3.1 E-mail Bid to Mr. Caleb Elrod at the below listed e-mail address with read receipt requested.

Mr. Caleb Elrod celrod@ssbtexas.com

4.3.2 General Contractor is to submit the completed sub-contractor list provided by Architect with their Bid.

4.33 Bids must be submitted on Proposal Form furnished by the Architect.

4.3.4 Proposal showing omissions, alterations of wording, conditional bids, riders, or changes to any requirements which qualifies or modifies the proposal shall be rejected as irregular and nonresponsive.

4.3.5 Proposals shall be submitted in single copy. An extra copy of the Proposal Form may be supplied for the Bidder's use, for his own records.

4.3.6 Only one Proposal shall be submitted by each Bidder.

4.3.7 Where the Bidder is a corporation: Proposal must be signed with the legal name of the corporation followed by the name of the State of Incorporation, the legal signature of an officer authorized to bind the corporation to a contract, and the seal of the corporation.

4.3.8 Proposals received after the advertised time for the bid opening will be ineligible and will be returned unopened.

ARTICLE 5 – REJECTION OF BIDS

Add the following:

5.3.3 **The Owner shall approve all subcontractors** and has the right to reject any listed subcontractor, supplier, or material man submitted at the time of bid for any reason. Prior to award, the selected bidder must resubmit subcontractors, suppliers or material men acceptable to the Owner.

ARTICLE 6 - POST BID INFORMATION

Add the Following:

6.3 Submittals; Delete paragraph 6.3.1 in its entirety and add the following:

6.3.1 The Bidder shall, within three (3) days of notification of selection for the award of a Contract for the Work, submit the following information to the Owner:

.1 a designation of the Work to be performed by the Bidder with his own forces.

.2 the proprietary names and the suppliers of principal items or systems of materials and equipment proposed for the Work;

.3 a list of names of all Subcontractors or other persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work;

.4 an organizational chart and list of proposed jobsite and office staff directly involved with this Project. Indicate the qualifications, titles, responsibilities, and duties of each person;

.5 certificates evidencing Public Liability and Owner's Protective Insurance in the amount specified.

.6 an interim construction schedule for the first sixty (60) day period in a form acceptable to the Owner and Architect with a detailed description of the overall project plan indicating sequencing, phasing, and milestones.

.7 a completed Schedule of Values in a format acceptable to the Owner.

.8 a written Safety Policy indicating all procedures and record keeping requirements to comply with O.S.H.A.

Delete paragraph 6.3.3 in its entirety and add the following:

6.3.3 Prior to the award of the Contract, the Owner will notify the Bidder in writing if, after due investigation, he has reasonable objection to any such proposed person or entity, the Bidder may, at his option, (1) withdraw his Bid, or (2) submit an acceptable substitute person or entity with an adjustment in his bid price to cover the difference in cost occasioned by such substitution, except as prohibited by the Supplementary General Condition. The Owner may, at his discretion, accept the adjusted bid price or he may disqualify the Bidder.

ARTICLE 7 -PERFORMANCE BOND AND PAYMENT BONDS

7.1 Bond Requirements: Delete this Article in its entirety and add nothing back.

END OF SECTION 000002-B

SECTION 000021 SUPPLEMENTARY GENERAL CONDITIONS

GENERAL CONDITIONS

The General Conditions of this contract is the American Institute of Architect's Document AIA Document A201-2007, "General Conditions of the Contract for Construction" 2007 Edition, 38 pages, herein referred to as "AIA General Conditions. A complete set of the AIA General Conditions is included in these specifications and is also available at the office of the Architect for inspection.

SUPPLEMENTAL GENERLAL CONDITIONS

The supplementary General Conditions contain changes and additions to the AIA General Conditions. Where any part of the AIA General Conditions is modified or voided by the Supplementary General Conditions, the unaltered provisions of the General Conditions shall remain in effect.

ARTICLE 2 -OWNER.

2.2 Owner Information and Services Required of the Owner: Delete paragraph 2.2.5 in its entirety and add the following paragraph.

2.2.5 Unless otherwise provided in the Contract Documents, at the time of award of the Contract, the Architect will furnish, free of charge to the General Contractor ONE (1) complete sets of drawings and one (1) set of specifications (Volume. I and Volume. II) and one (1) PDF disc with complete drawings (plans) and specifications. At the request of the General Contractor, additional sets of drawings and specifications will be furnished upon payment to the architect for the actual reproductions cost of the additional sets.

ARTICLE 3-CONTRACTOR

3.2 Review of Contract Documents and Field Conditions by Contractor: Delete paragraph 3.2.1; in its entirety and substitute the following: 3.2.1

3.2.1 Contractor shall check drawings and specifications immediately upon their receipt and shall notify the Architect in writing not later than ten (10) days after receipt of them of errors, discrepancies, or omissions. The contractor shall verify and shall be responsible for errors that might have been avoided by such a check. Deviations from drawings and dimensions shall be made only with the Architects' permission. In cases of any discrepancy concerning dimensions. quantities and location, the Contractor shall, in writing, call to the attention of the Architect any discrepancies between specifications, plans, details and schedules. The Architect will then inform the Contractor in writing which document takes precedence.

3.4 Labor and Material: Add the following paragraph:

3.4.4 Contractor and his sub-tiers shall conform to the labor laws of the State of Texas, and the various acts amendatory and supplementary thereto, and all other laws, ordinances, and legal requirements applicable thereto. Applicable Federal Laws shall be complied with.

3.5 Warranty: Add the following paragraph:

3.5.2 The Contractor shall furnish the owner with a written guarantee against defective material and workmanship for a period of one year from the date of Final Acceptance of the work. He shall secure all written guarantees and warranties called for in the specifications. The contractor is responsible for the guarantee of the entire work performed under this agreement with the owner. Where guarantees are specified in any section of the specifications for longer periods, such longer periods shall apply.

3.7 Permits. Fees and notices: Add the following paragraphs:

3.7.1 The Contractor shall submit and secure, and the Owner shall pay for the building permit as well as other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the work that are customarily secured after execution of the Contract and legally required at the time bids are received and negotiations concluded. The Owners shall pay for all impact and service fees of utility companies for connection of permanent services of water, electrical, gas, and sewage.

3.7.6 Upon completion of the work the contractor shall deliver to the owner through the architect all required certificates of inspection and occupancy.

3.12 Shop Drawings Product Data and Samples: Add the following paragraphs:

3.12.11 Data involving standard manufactured products or materials shall be submitted to Architects and engineers for Review to confirm design intent. Contractors are to submit three (3) physical samples of all required material or finish submittals.
Contractors may submit required manufacturer's literature, engineering and shop drawings in the form of PDF's or paper. If providing submittal in paper form, Contractors are to provide five (5) copies of all items. Submittals shall be in the form of manufacturer's catalog: and data sheets showing illustrations of the products to be furnished, scaled, details, dimensions, performance, characteristics, capacities, wiring diagrams, control and other pertinent information. Shop drawings are to be drawn or produced by the contractor or sub-contractors. It is not acceptable to submit Architect's Own Drawings as shop drawings.

3.12.12 Shop drawings not submitted according to the above procedure will not be reviewed but will be returned at the contractor's expense for re-submittal.

ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

4 1 Architect; Delete paragraph 4.1.1. in its entirety and add the following paragraph:

The architect is the person lawfully licensed to practice architecture, or any entity lawfully practicing architecture and is referred to throughout the contract documents as if singular in number. The term “Architect" means the owner or the owner's authorized representative. The terms "Owner" and "Architect" therefore, shall be one and the same.

ARTICLE 5 - SUBCONTRACTORS

5.1 Definitions'. Add the following paragraph:

5.1.3 Nothing contained in the contract documents shall create any contractual relations between the Owner or Architect and any sub-tier, material man or supplier, nor shall there be any obligation on the Owner to pay or see to the payment of any sums due any sub-tier, material man or supplier, nor create any obligation of any kind, express or Implied, upon the owner or architect in favor of any sub-tier, material man or supplier.

ARTICLE 7 - CHANGES IN THE WORK

7.1 Changes in the Work: Modify paragraph 7.3 as follows:

7.2.2 All Change Orders, Construction Change Directives, and Proposal Requests are to be sent to Owner's Representative for logging and distribution.

7.3.1.1 In subparagraph 7.3.7, the allowance for the combined overhead and profit included in the total cost to the Owner shall be based on the following schedule: For the contractor, for work performed by the Contractor’s own forces ten percent of costs. Zero percent of the cost for Contingency Allowance Chance Orders. For the contractor, for work performed by the contractor's sub-tier, five (5) percent of the cost Zero percent for Contingency, Allowance: Change Orders. For each sub-tier, material man or supplier involved, for work performed by that sub-tier, material man or suppliers’ own forces ten (10) percent of the cost.

7.3.15 Cost to which overhead and profit is to be applied shall be determined in accordance with subparagraph 7.3.7.

ARTICLE 8 - TIME

8.1 Delays and Extension of Time: Add the following paragraph:

8.3.4 Extensions of time will be granted only if the item, tasks or phase of construction delayed is critical to the Work and so indicated on to: contractor's schedule.

8.3.5 Extensions of time due to adverse weather conditions not reasonably anticipated will be granted only because of such inclement weather occurring on a normal working day and preventing the execution of the major or critical item of construction ordinarily formed attaint time. Extensions of time for weather delays will be considered only if such inclement weather exceeds that normally recorded by the National Weather Bureau for the same month and location.

8.3.5.1 Under the provisions of the Articles: changes in Work - Article 12 Termination Of The Contract-Article 14: Work Done By Owner Or By Separate Contractor-Article 6; Time-Article 8: and Owner's Right To Stop The Work- Article 3 of the General Conditions, and the foregoing provisions of this Article 8: the Contractor shall not be deemed entitled to a time extension for delays in non-critical activities of the approved schedule unless the duration of the excusable delay exceeds the total float of the activities affected by the delay, the Contractor shall be entitled to an extension equal to the difference. The definitions of non-critical activities and "total float" shall be as provided in the Associated General Contractors of America Publication, The Use of CPM in Construction, a Manual for General Contractors.

8.3-5.2 The Contractor will not be allowed any additional compensation for delays such as adverse weather, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the Owner's control.

8.3.5.3 For the Johnson City area, the climatological data is recorded at the Austin-Bergstrom International Airport weather station. The Contractor may expect adverse weather for the numbered calendar days in accordance with the following local climatological data prepared by NOAA.

0.1.00 ln. Or More Precipitation At
Austin-Bergstrom International Airport

January	3	July	3
February	3	August	1
March	4	September	2
April	2	October	2
May	3	November	1
June	4	December	2
			30

Total Days Lost: 30

The Contractor agrees that the measure of adverse weather during the period covered by the Specification shall be the number of days in excess of those shown for each month.

8.3.5.4 Contractor shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management under this contract; the accounting and control systems shall be satisfactory to the Owner. The Owner and the Owner's accountant shall be afforded access to the Contractor's records, books, correspondence, instructions, drawings, receipts subcontracts, purchase orders, vouchers, memoranda and other and other data relating to this Contract, and the Contractor shall preserve these for a period of four years after final payment, or for such longer period as may be required by law.

8.3.5.5 The Owner shall require an audit of the Contractor's records. The audit shall be conducted by the Owner's personnel or authorized representative. The owner reserves the right to audit at any time during construction and within one (1) year after the Substantial Completion of the Work.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.1 Contract Sum: Add the following paragraph:

9.1.2 All costs of overtime work required by the nature of this work, except emergencies as covered in Article 10.3, shall be included in the base bid proposal.

Application For Payment: Add the following paragraph:

9.3.2 Along with the progress schedule, the contractor shall submit to the architect a schedule of the anticipated amount of each monthly amount that will become due the contractor in accordance with the progress schedule. Upon the contractor's application for payment, the Owner will make payment on the account of the contract as follows:

On or about the tenth day, before the end of each month (Ninety Percent) 90% of the value, based on the Contract price of labor and materials incorporated in the work and of materials suitably stored at the site thereof up to the first day of that month, as estimated by the architect, less the aggregate of previous payments; and upon substantial completion of the entire Work.

9.3.3 The General Contractor shall submit each application for payment, an affidavit certifying that payment have been made to all subcontractors and suppliers for all the work which the General Contractor has been paid.

9.3.4 The contractor shall submit with each application for payment for previous month, which concludes the work of a sub-tier material man or supplier, a certificate of release and waiver of lien from the sub-tier material man or supplier. Failure of the Contractor to supply these Certificates of Release and waivers of Lien and claims will be due cause for the Owner to withhold the payment otherwise due until they are presented.

9.5 Decisions to Withhold Certification: Add the following paragraph:

9.5.1.8 The Architect will not issue any Certificates of Payment for any progress payment to the contractor subsequent to the work completion date specified In Article 3 of the Agreement Between Owner and Contractor.

9.6 Progress Payments: Delete 9.6.1 and add the following paragraph:

9.6.1 Based in Application: for Payment to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the contract sum to the Contractor as provided in the conditions of contract as follows, unless otherwise provided in the agreement.

9.6.1.1 Contractor shall submit his Application For Payment no later than the last day of the period covered by the Application For Payment, ninety percent (90%) of the proportion of the contract sum properly allocable to labor, materials and equipment incorporated in the work and ninety percent (90%) of the portion of the contract sum properly allocable to materials and equipment suitably stored at the site or at some other location agreed upon in writing by the parties, up to ten (10) working days prior to the date on which the Application For Payment Is submitted. It is the aggregate of previous payments in each case; and upon substantial completion of the entire work ninety percent (90 %) of the contract sum, less such retainage as the Architect shall determine for all incomplete work and unsettled claims.

9.6.1.2 Final Payment, constituting the entire unpaid balance of the contract sum shall be paid by the: Owner to the contractor thirty (30) days after substantial completion of the work unless otherwise stipulated in the Certificate of Substantial Completion, provided the work has then been completed, the contract fully performed, and a final Certificate For Payment has beets issued by the architect.

9.6.1.3 Contractor and sub-tier shall submit all requests for payment indicating separate amount: for labor and material.

9.8 Substantial Completion:

DELETE 9.8.1 (on page 25 of the AIA Document A201.-.2007) in its entirety and ADD back the following paragraphs):

9.8.1 The term "Substantially Complete" as used in the Contract Documents shall mean that the construction is sufficiently complete, so that the Owner can occupy or utilize the work or designated portion thereof for the use for which it is intended. Upon Substantial Completion of each area, the only labor or materials installation to be performed by the Contractor will be to complete items listed on the approved punch list.

If any contractor shall be delayed in the: completion of his: work by reasons any unforeseeable causes beyond his control and without his fault or negligence, included but not restricted to, acts of God, acts or neglect of the Owner, acts or neglect of any other contractor, fires. floods, epidemics, quarantine restrictions, strikes, or freight embargoes, the period herein above specified for completion of his work may be extended by such time as shall be fixed by the Architect but the Contractor shall not, be entitled to any damages or compensation from the Owner on accounted any delay or delays resulting from any of the aforesaid causes.

DELET E 9.8.4 (on page 26 of to: AIA Document A201-2007) in its entirety and ADD back the following paragraph:

9.8.4 When the Architect on the basis of an inspection determines that the work or designated portion thereof is substantially complete, even though some items on the contractor's list have not been completed or corrected, he may prepare a Certificate of Substantial Completion, shall establish responsibilities of the owner and contractor for security, maintenance, heat, utilities, damage to work and issuance, and shall fix the time within which the contractor shall finish all items on the list accompanying the certificate.

ARTICLE 11 INSURANCE AND BONDS

11.1 Contractors Liability Insurance: Delete 11.5.2 in its entirety and Add the following paragraph:

11.1.2 The insurance required by paragraph 11.1.1 shall be written forest less thin limits of liability specified in the contract documents or required by law, whichever coverage is greater. Coverage written on an occurrence basis, shall be maintained without interruption from date of commencement of the work until date of final payment and termination of any coverage required to be maintained after final payment.

REFER to the Additional Terms Agreement, Section 5, “Insurance” for the insurance requirements.

Add the following paragraph:

11.1.2.1 Furnish one (1) copy of each Certificate of insurance for each copy of the agreement. Specifically set forth evidence of all coverage required.

11.3 Property Insurance:

DELETE 11.3.1 (on page 29 and page 30 of the AIA Document A201-2007) in its entirety and ADD back the following paragraph:

The CONTRACTOR on behalf of the Owner, shall purchase and maintain, at the CONTRACTOR'S expense, in a company or companies lawfully authorized to do business in the jurisdiction in which the project is located, property insurance written on builders risk “All Risks” or equivalent policy form in the amount of the completed value of work on the following form: Completed Value. In the names of the Owner and Contractor as their interests lay appear with limits as equal to the contract sum for the work The CONTRACTOR shall file a copy of all policies with the Owner before an exposure to loss may occur. All such policies shall be opened to inspection by the Owner. lf the CONTRACTOR fails to provide any insurance required or furnish evidence of coverage on request, the Owner may insure his own interest and charge the cost thereof to the CONTRACTOR.

DELETE paragraphs 11.3.1.2 and 11.3.1.3 (on page 30 of the AIA Document A201-2007) in its entirety and ADD back the following paragraphs:

11.3.1.2 Before an exposure to loss may occur, to: contractor shall file with the Owner two (2) certified copies of the policy or policies, issued in the names of the contractor and owner as their interests may appear, providing Property Insurance coverage, containing those endorsements specifically related to the project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least thirty (30) days after written notice has been given to the Contractor and Owner. If the policy is canceled for any reason, the Owner may insure his own interests red charge costs thereof the Contractor. Owner and Contractor intend that any policies provided in response to (the property insurance provisions) shall protect all of the parties insured and provide primary coverage for all losses and damage caused by the perils covered thereby.

Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any of the parties named as insureds or additional insureds.

11.3.1.3 If the property insurance requires deductibles-The Contractor shall pay costs not covered by such deductibles.

DELETE 11.4 PERFORMANCE AND PAYMENT BONDS (on page 30 of the AIA Document A201-2007) in its entirety and add nothing back.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.4 Termination Bv The Owner For Convenience; Delete paragraphs 14.4.1. 14.4.2 and 14.4.3 in their entirety and add to following paragraphs:

14.4.1 The Owner reveries the right to terminate the Contract for convenience and without cause even though contractor has not failed to perform any part of the Contract. Termination if the work here under shall be affected by written notice to the Contractor. Upon receipt of such notice contractor shill unless the optic otherwise directs:

1. Immediately discontinue the Work and the placing of all orders and subcontracts in connection with this contract;

2. Immediately cancel all of the existing orders and sub- tiers made hereunder;

3. Immediately transfer to the Owner all materials, supplies, Work in progress, appliances, facilities, machinery and tools acquired be the Contractor in connection with the performance of the Contract, and take such action as may be necessary or as the Owner may direct for protection and preservation of the work relating to this Contract; and:

4 Deliver plans, drawings, specifications and other necessary information to the Owner.

14.4.2 l If the Owner terminates the Contract for convenience, the following shall be the Contractor's exclusive remedy: '

1. Reimbursement of all actual expenditures and costs approved by the Owner as having been made or incurred in performing the work;

2. Reimbursement of expenditures made, and costs incurred with the Owner's prior written approval in settling or discharging outstanding commitments entered into by the Contractor in performing the Contract; and

3. Payment of profit, in so far as profit is realized hereunder, of an amount equal to the estimated profit on the entire Contract at the time of termination multiplied by the percentage of completion of the Work, in no event shall the Contractor be entitled to anticipated fees or profits on work not required to be performed.

14.4.4. All obligations of the Contractor under the contract wish resolved to completion of the Work, including but not limited to all warranties, guarantees and indemnities, shall apply to all work completed or substantially completed by the Contractor prior to a convenience termination by the Owner. Notwithstanding the above, any convenience termination by the Owner or payments to the Contractor shall be without prejudice to any claims or legal remedies that the Owner may have against the Contractor for any cause.

14.4.4 Upon a determination that a termination of this contract other than a termination for convenience under this Article was wrongful or improper for any reason, such termination shall automatically be deemed converted to a termination for convenience under this Article, and the contractor's remedy for such wrongful termination shall be limited to the recoveries specified under paragraph 14.4.2 of this Article.

14.4.5 REFER to Additional Terms Agreement, Section 3, “Termination".

END OF SECTION 000021

WELLBORN
ENGINEERING &
SURVEYING

Geotechnical Engineering Report:

Report Number:
26-084-01

Security State Bank and Trust
Johnson City, Texas
May 27, 2026
WES-Project No. 26-084

Prepared for:
Security State Bank and Trust
Fredericksburg, Texas 78624

Prepared by:
Wellborn Engineering & Surveying (WES)
631 Water Street Kerrville, Texas 78028
TBPELS FIRM NO.: F7761

WELLBORN
ENGINEERING & SURVEYING

Experience Integrity Satisfaction

TBPE&LS Engineering Firm No. F7761
TBPE&LS Surveying Firm No. 10194410

May 27, 2026

Client:
Security State Bank and Trust
c/o: Mr. Mark Cornett, P.E.
1174 Funf Kinder
Fredericksburg, Texas 78624
mark@cornettengineering.com
210-213-1195

RE: **Geotechnical Engineering Report for the proposed Security State Bank and Trust to be located off Highway 356 and Old River Road in Johnson City, Texas**

WES Project No. 26-084 Security State Bank and Trust (Geotechnical)

Dear Mr. Cornett,

We have completed the geotechnical investigation for the above-mentioned project. This report presents the findings of the subsurface exploration and provides geotechnical recommendations consisting of earthwork and design of the foundation and associated pavement for the proposed project.

We appreciate the opportunity to work with you on this phase of the project and look forward to the opportunity to provide additional services for construction materials testing as the project progresses. If you have any questions concerning this report, or if we may be of any further service, please contact us.

Sincerely,
Wellborn Engineering & Surveying
TBPE Firm No. F7761

05/27/2026

STATE OF TEXAS
DANIEL R. KOVACICH
127402
LICENSED
PROFESSIONAL ENGINEER

Daniel R. Kovacich, P.E.
Geotechnical Department Manager
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DRK/
-Copy submitted via email only

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1.0 INTRODUCTION

1.1 Project Description

This report presents the results of a subsurface exploration and foundation evaluation performed for the Security State Bank and Trust to be located on Highway 356 and Old River Road in Johnson City, Texas. The general orientation of the proposed site is shown on the Plan of Borings in the **Appendix** section of this report.

Based on information provided by the client, the project consists of construction of an approximate 4,500-square foot office building, a drive-thru aisle, and associated site paving for parking and drives.

1.2 Authorization

This investigation was authorized by Ms. Suzan Gallion of Security State Bank and Trust by signature of proposal on March 25, 2026.

1.3 Purpose and Scope

The purpose of this investigation has been to evaluate the general subsurface and ground water conditions, and to provide geotechnical recommendations for:

- Design of the foundation system;
- Pavement subgrade preparation and section thicknesses; and
- Site preparation and earthwork compaction criteria

The investigation included drilling sample borings, performing laboratory testing, analyzing engineering and geologic data and developing geotechnical recommendations. The following sections present the methodology used in this investigation.

Recommendations provided herein are site-specific and were developed for the project discussed in the report **Introduction**. Person(s) using this report for other than the intended purpose does so at their own risk.

2.0 FIELD AND LABORATORY INVESTIGATIONS

2.1 General

The field and laboratory investigations have been conducted in accordance with applicable standards and procedures set forth in the 2026 Annual Book of ASTM Standards, Volumes 04.08 and 04.09, "Soil and Rock." These volumes should be reviewed for information on specific test procedures.

2.2 Field Investigation

Subsurface conditions were evaluated by six sample borings drilled to depths of 6 to 20 feet on May 4 and 5, 2026. The locations of the borings are shown on Plate 1 of the report contained in the **Appendix**. Borings were located in the field by representatives of Wellborn Engineering & Surveying (WES).

Borings were advanced between sampling intervals by means of a truck-mounted drilling rig using continuous flight augers. The soils were sampled in conjunction with the Standard Penetration test (SPT) (ASTM D1586).

Delayed water level observations were made in the open boreholes to evaluate ground water conditions. Borings were backfilled at completion of field operations.

Sample depth, description of materials, field tests, water conditions and soil classification [Unified Soil Classification System (USCS), ASTM D2488] are presented on the Boring Logs in the **Appendix** section of this report. Keys to terms and symbols used on the logs are also provided in the **Appendix**.

Elevations shown on the boring logs are approximate and are based on the latest available TNRES information.

2.3 Laboratory Testing

All samples were returned to the laboratory and visually logged in accordance with the USCS. Laboratory tests were performed to evaluate index properties and confirm visual classification of selected samples. Tests and ASTM designations are provided in Table 1.

TABLE 1.
TESTS CONDUCTED AND ASTM DESIGNATIONS

Type of Test	ASTM Designation
Atterberg Limits	D4318
Moisture Content	D2216
Partial Gradation	D1140

The results of these tests are presented on the accompanying bore logs provided in the **Appendix.**

3.0 GENERAL SITE CONDITIONS

3.1 Physiography

The proposed project site is approximately 2.24-acres and is located at the southwest intersection of Highway No. 356 and Old River Road in Johnson City, Texas. Based on topographic information, the site was relatively flat with ground elevations ranging from Elev. 1161 to 1156 feet.

Ground cover consisted of short and tall grass, and a couple scattered trees at the time of the field investigation (May 2026). The most recent aerial photograph, dated March 2025, is provided as Exhibit 2 in the **Appendix**.

3.2 Geology and Stratigraphy

Subsurface conditions encountered in the borings consisted of residual soil overlying dolomitic limestone of the Ordovician age Gorman Formation. The residual soil consisted of dark brown, stiff to hard, high plasticity (CH) sandy fat clay. The residual clay extended to depths of 2-1/2 to 4 feet below existing grades.

Below depths of 2-1/2 to 4 feet (approximate Elev. 1160 to 1156.5 feet), tan, very hard dolomitic limestone was encountered. Due to the sampling methods utilized and the very hard nature of the bedrock materials encountered, it was difficult to definitively distinguish between limestone and dolomite in the borings. The limestone extended through the termination depths of the borings. In addition, some borings were terminated at refusal due to the very hard nature of the bedrock.

3.3 Ground Water

Ground water was not encountered during or after drilling operations within the depths explored. It should be noted that water levels in open boreholes may require several hours to several days to stabilize depending on the permeability of the subsurface materials. In addition, groundwater levels or zones of seepage through soil/rock interfaces or within fractures and seams in the limestone, will vary with seasonal and annual rainfall changes, recent rainfall, drought or temperature effects.

3.4 Seismic Site Classification

The site has been classified with respect to seismic design criteria contained in the 2024 International Building Code (IBC), Section 1613, and ASCE 7-22, Chapter 20. The criteria require characterization of the upper 100 feet of subsurface materials. Given that the borings were limited to a maximum depth of 20 feet, the design professional preparing the engineering report may make reasonable assumptions based on the known geologic conditions. Based on

the ASCE 7-22 criteria and gathered field data, WES recommends that the site be classified as Site Class B in accordance with Table 20.3-1.

4.0 ANALYSIS AND RECOMMENDATIONS

4.1 Potential Vertical Rise

The clay at this site is high in plasticity and is relatively shallow prior to encountering non-plastic dolomitic limestone. Potential Vertical Rise (PVR) were evaluated using the Texas Department of Transportation, TxDOT Test approximate Method 124-E[1] in conjunction with soil classification tests and assumed an active zone to the top of intact dolomitic limestone. **Based on the PVR calculations, potential movements are estimated to be approximately two inches.** Movement will be associated with seasonal changes in soil moisture within the upper clay soils above the intact limestone. The estimated PVR is based on existing grades.

Higher magnitudes of movement than those calculated above are possible if the clays become saturated, such as can happen from utility leaks, excessive ponding of water adjacent to the perimeter (i.e., poor drainage). It is anticipated that when completely inundated with water and allowed to become statured, which would likely be the case if proper drainage around the building structure are not provided or if a broken plumbing line was to occur, the subgrade soils could swell 2 to 3 times or more the magnitude estimated by the PVR method mentioned above.

Ground-supported improvements (i.e., sidewalks and paving) will move in response to changes in soil moisture. The movement will be observed as heave if the soils are dry at the time the pavement or sidewalk is constructed. The movement will be observed as settlement if the soils are moist at the time of construction. Generally, settlement will be limited to the outer perimeter (outer four to five feet) of larger slabs.

4.2 Foundation, General

Based on the type/size of structure and past experience, use of a monolithic slab on grade foundation is anticipated if movements of at least 1-inch can be tolerated. If movements of this magnitude cannot be tolerated, an alternative design consisting of deep piers on a structural suspended slab is recommended. WES should be contacted for additional recommendations if this type of foundation system is desired.

The foundation may be designed as a conventionally reinforced or post-tensioned slab-on-grade. Potential movements are estimated to be on the order of two inches. Soil supported foundations will be subjected to this movement, as discussed earlier in this report. The magnitude of differential movement can be reduced by stiffening the foundation (i.e.,

[1] "Method for Determining the Potential Vertical Rise, PVR." (1978). Texas Department of Transportation, Test Method Tex-124-E.

increasing the beam depths and/or decreasing beam spacing) and by reducing the potential for soil movement prior to construction of the slab.

The recommendations contained below are applicable considering that the finished grade of the structure is within two foot from existing (May 2026) site grades. If more than two feet of fill is required to achieve finished grade, WES should be provided with a final site grading plan for re-evaluation of the recommendations and prior to finalizing construction documents.

4.3 Building Subgrade Improvement

To reduce the potential for heave-related movement before constructing the building foundation, it is recommended that the upper two feet of subgrade soils below existing grades be undercut and replaced with imported select fill. Select fill specifications are included in the "**Earthwork**" section. All additional fill above existing grade should also consist of select fill.

Although the foundation can be structurally designed to tolerate soil-related movements in excess of 1 inch, it should be understood that utilization of a design PVR greater than 1-inch increases the potential risk of greater structural and cosmetic distress. Even slight differential movements may cause distress resulting in cosmetic damage. This amount should be understood and addressed during the design phase of the proposed structure planned for construction at this site.

Other Considerations: Careful consideration should be given to the actual area treated to reduce movement. The potential for movement will be reduced in the treated (i.e., replacement) areas; however, it may be advantageous from a building perspective to extend the treated zone to account for the flatwork areas. **If it is desired to improve performance and reduce the risk of heave-related movement in areas near the building structure, it is recommended the subgrade be excavated and replaced as specified above, extending to the edge of all movement-sensitive flatwork.**

Positive drainage of water away from the structure must be provided and maintained during and after construction.

Potential post-construction movement associated with heave, considering subgrade replacement outlined in the preceding section, is estimated to be on the order of one inch or less. Additional movement, especially during construction, is possible if the clays become saturated, such as can happen from utility leaks, ponding of water adjacent to the slab during construction, and excessive ponding of water adjacent to the perimeter walls after construction.

4.4 Foundation Design

The proposed building at the site may be supported by a slab-on-grade foundation provided our recommended earthwork preparations are followed as outlined in the **"Earthwork"** and **"Building Subgrade Improvement"** sections of this report. This type of foundation can be designed as a conventionally reinforced or post-tensioned slab-on-grade. It is recommended that a conventionally reinforced slab be designed to conform to the current requirements of the American Concrete Institute (ACI) "Building Code Requirements for Reinforced Concrete," ACI 318. A post-tensioned slab should conform to the requirements of the 3rd Edition of the PTI Manual "Design and Construction of Post-Tensioned Slabs-on-Ground."

The design parameters outlined in the following tables are based on the subsurface conditions encountered during this exploration and the recommendations for pad preparation provided herein. The parameters are provided to assist the Structural Engineer in the design of the foundations that are stiffened using grade beams or post tension cables.

TABLE 2. SLAB DESIGN PARAMETERS FOR A CONVENTIONALLY REINFORCED SLAB	
Climate Rating (C_w)	17
Effective Plasticity Index	19
Soil Support Index / Climatic Rating Factor (1-C)	0.94

TABLE 3. SLAB DESIGN PARAMETERS FOR A POST TENSIONED SLAB	
E_m Edge (ft)	4.3
E_m Center (ft)	8.5
Y_m Edge (in)	1.5
Y_m Center (in)	1.2

All grade beams of the slab-on-grade foundation should be founded a minimum of 18 inches below finished grade in compacted select fill. Grade beams bearing in properly compacted select fill may be designed for an allowable bearing of 2,500 pounds per square foot (psf). This value incorporates a minimum factor of safety of three against shear failure.

The exterior grade beams should be a minimum of 12 inches wide to reduce the potential for localized shear failure and should be spaced at a maximum of 20-feet apart in both directions if and where the Structural Engineer of Record deems necessary. In addition, all beams should be provided with sufficient steel reinforcement for positive and negative moment resistance caused by loading and minor movements of foundation soils.

Soil supported foundations will be subjected to slight vertical movements. Even slight differential movements may cause distress to interior wall partitions and rigid exterior facades supported by a slab on grade foundation resulting in cosmetic damage and should be accounted for in the design process. In addition, elements of the foundation that form cantilevers (such as bay windows or other protrusions) are more vulnerable to differential movement relative to the larger areas of the foundation. Contraction, control, or expansion joints should be designed and placed in various portions of the structure. Properly planned placement of these joints will assist in controlling the degree and location of material cracking which normally occurs due to material shrinkage, thermal effects, soil movements, and other related structural conditions.

A minimum 10-mil (0.25 mm) thick vapor retarder (i.e., polyethylene sheet) is recommended below the foundation to limit migration of moisture through the slab from the underlying soil. The vapor retarder should conform to ASTM E1745, Class C or better and should have a permeance of less than 0.1 perms tested in accordance with ASTM E96. Penetrations and lapped joints should be sealed to ensure its integrity. Please refer to the latest edition of ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials and ASTM E1643, "Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs" for additional guidance on this issue.

Beam excavations should be dry and free of all loose or soft soils and deleterious materials prior to placement of concrete. Cavities formed as a result of excavation of soft or loose zones should be backfilled with properly compacted select fill. Inspection of the foundation excavations by a representative of this office is recommended prior to placement of the concrete.

4.5 Pavement

Both rigid and flexible pavements were analyzed for car and light truck traffic and parking and for drives and service areas. Overall, the specific pavement section will be dependent upon:

1. traffic loads and frequency;
2. pavement type and strength;
3. desired pavement life and ending condition; and
4. strength and condition of the subgrade

Information regarding the conditions stated in Items 1 through 3 was not available at the time of this report writing. In addition, specific laboratory testing to define the subgrade strength (i.e. CBR/K values), as outlined in Item 4, was beyond the scope of the investigation. However, reasonable engineering assumptions can be utilized for the purpose of the analysis in order to provide sections for both rigid and flexible pavements.

Based on the field and laboratory investigations, the upper surface soil consists of high plasticity sandy fat clays. For purposes of pavement analysis, the subgrade was assumed to be recompacted in accordance with the density and moisture recommendations in the **"Earthwork"** section. An effective modulus of subgrade reaction, k, of 100 pci, and a CBR of 3 were used. These values were estimated based on WES's knowledge and experience with similar soils and projects in this area.

Generally for rigid or concrete pavement, it is more cost effective to increase the pavement thickness and construct over a non-lime stabilized subgrade. However, stabilization does provide an all-weather working platform for the contractor, and this may be beneficial from a construction perspective, especially if construction will occur during the wetter part of the year, regardless of pavement type. Refer to the **"Earthwork"** section for additional information regarding the lime stabilization specifications.

Recommended pavement sections for light and heavy-duty traffic conditions are provided in Tables 4 and 5. Light duty is for areas expected to receive only car traffic. Heavy assumes the main access drive areas.

TABLE 4. FLEXIBLE PAVEMENT SECTION				
Section	**Light Duty (Car Parking Areas)**		**Heavy Duty (Main Access Drive Areas)**	
Hot Mix Asphaltic Concrete (HMAC) TxDOT Item 340 Type D Surface Coarse	2.0"	2.0"	2.0"	2.0"
Limestone Base Material (TxDOT Item 247 Grade 1-2)	8.0"	6.0"	12.0"	10.0"
TENSAR Geogrid	--	HX-5.5	--	HX-5.5
Compacted Subgrade	6"		6"	

TABLE 5. CONCRETE PAVEMENT SECTION		
Section	**Light Duty (Car Parking Areas)**	**Heavy Duty (Drives Areas)**
Reinforced Concrete (Minimum 3,500 pounds per square inch)	5.0"	6.0"
Compacted Subgrade	6"	6"

The heavy-duty concrete at the location of the trash dumpster should be 8-inches in thickness and be large enough to accommodate both the front and rear wheels of the vehicles used to pick up the trash dumpsters. Maintenance or operations managers need to stress the importance of placing the trash dumpsters in their proper locations to reduce the distress trash pickup operations place on the pavement.

Designs are based on a 20-year service life and are comparable to similar type projects in the area.

Analysis of Table 4 indicates an approximate 16 to 25 percent decrease in the thickness of the limestone base section can be obtained by using a geogrid such as a TENSAR HX-5.5 or equivalent. If utilized, it is recommended the geogrid be placed beneath the base material and on top of the compacted subgrade and overlapped in accordance with the manufacturer's recommendations. Overall, a geogrid will significantly improve the long-term performance of the pavement and reduce cracking. Regardless, periodic maintenance of asphalt pavement will be required.

Proper drainage and careful selection of base materials are critical to the performance of asphalt pavement. Ruts and birdbaths can lead to rapid pavement deterioration, mainly because they cause water to saturate the underlying base and subgrade soils.

Concrete pavement is more durable and will have long-term maintenance benefits compared to asphalt pavement. At a minimum, concrete pavement is recommended in areas that receive continuous repetitive traffic such as the drive approaches, truck turning and loading areas, and trash dumpster pads and approaches.

Concrete pavements should be properly reinforced and jointed, as per ACI, and should have a minimum 28-day compressive strength of 3,500 psi. Reinforcing for 6-inch-thick pavements should consist of #4 bars spaced at 18 inches on center each way, and 12 inches on center each way for pavements of 7-inch thickness or greater.

Concrete pavement sections should be saw-cut at an approximate spacing in feet of 2.5 to 3 times the pavement thickness expressed in inches, not to exceed a maximum spacing of 20 feet. (For example, a 6-inch pavement should be saw-cut in approximately 15 to 18-foot squares.) The actual joint pattern should be carefully designed to avoid irregular shapes. Recommended jointing techniques are discussed in detail in "Guide for Design and Construction of Concrete Parking Lots," published by the American Concrete Institute[2].

4.6 Earthwork

The earthwork construction will involve site and subgrade preparation, along with fill placement. The following subsections offer recommendations for preparing specifications for the work. Additionally, general considerations for foundation construction and related site improvement methods are outlined at the end of the section.

Site and Subgrade Preparation - All vegetation, topsoil containing organic material, and any soft or loose materials should be cleared and grubbed at the beginning of earthwork construction. A stripping depth of at least 6-inches is recommended.

After completion of initial site preparation, the subgrade within the building pad and any movement-sensitive flatwork areas should be excavated to a depth of two feet below existing

[2] "Guide for Design and Construction of Concrete Parking Lots" (1987). American Concrete Institute, Publication MSP 34, Silver Spring, MD.

grades. **This subgrade preparation should extend a minimum of 5-feet outside the perimeters of the proposed structure, and a minimum of 2-feet beyond any movement sensitive flatwork constructed adjacent to the structure.**

Subgrade Preparation - Upon completion of the stripping and excavation operations, the exposed subgrade should be proof-rolled with a minimum 15-ton dump truck or loader. This procedure is intended to assist in identifying localized soft pockets and should be performed in the presence of a WES representative. If any soft pockets is identified by the proof-rolling operations, these areas should be removed to firm materials and replaced with compacted select fill.

After proofrolling operations are completed, the exposed subgrade soils should be scarified to a depth of 6-inches, moisture conditioned if necessary, and compacted. The subgrade soils should be compacted to at least 95-percent of the maximum dry density as determined by the Standard Proctor (ASTM D698). The moisture content should be maintained at or above the optimum moisture content.

Engineered Fill Materials – After site and subgrade preparation is complete (including proof rolling), fill placement may begin. Fill should consist of imported select fill within the building area to finished grade, and general fill soils and/or select fill for the remainder of the site grading.

Select Fill (Building Area) - Select fill material used at this site for the building pad should consist of imported crushed limestone base or a suitable pit run material. Imported limestone base select fill should meet the plasticity and gradation requirements set forth in Texas Department of Transportation (TxDOT) Standard Specifications 2024; Item 247, Type A, Grade 1-2.

Alternatively, pit run select fills may be utilized provided the material have a maximum liquid limit of 40-percent and plasticity index (PI) between 5 and 18, and classify as a clayey sand (SC), lean sandy clay (CL). The Geotechnical Engineer shall pre-approve the proposed select fill to be utilized at this site. **Regardless, any pit run material should be capped with a minimum of 6-inches of crushed limestone base.**

The select fill soils should be placed in no greater than 8-inch thick loose and horizontal lifts and shall be should be compacted to a minimum density of 95-percent of the maximum dry density as determined by the Standard Proctor (ASTM D698) and within 2-percantage points of the optimum moisture content.

General Fill – On-site excavated soils free of organics and deleterious materials or imported soils can be used to raise the site grades, as necessary. This applies to all areas outside the building extents. Imported general fill soils should have a Plasticity Index (PI) of 35 or less.

General fill should be placed in maximum 8-inch loose lifts (note, loose lift thickness must be compatible with the compaction equipment) and shall be compacted to a minimum of 95

percent of the maximum density as determined by ASTM D 698, "Standard Proctor". The moisture content of the general fill soils should be maintained at or above the optimum moisture content.

Lime Stabilization (Pavement Subgrade)- Although not required, the final 6-inches of pavement subgrade may be lime stabilized as discussed in the **Pavement** section of this report. If utilized, lime stabilization should be conducted in accordance with TxDOT "Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges," 2014 Edition, Item 260. A specific lime series test was not performed on the subgrade soils. For preliminary budgetary purposes, lime shall be properly mixed at a rate of 7-percent of the maximum dry unit weight of the raw subgrade soils as determined by ASTM D698. Assuming an in-place unit weight of 100 pcf for the pavement subgrade soils, this percentage of lime equates to about 32 pounds of lime per square yard of treated subgrade. Once the final grading operations have been completed, additional lime testing should be performed within the upper 12 inches to determine if a higher or lower percentage of lime is required.

After proper curing time, usually 48 to 72 hours, the lime-stabilized soils should be compacted to a minimum of 95 percent of Standard Proctor density, ASTM D698 at or above optimum moisture content.

General Considerations - It is important to note that proper compaction of soil requires both the correct moisture content and "compactive effort" or energy. The compactive effort, or energy, imparted into the soil by the equipment used for compaction, has to be compatible with the lift thickness. The lighter the equipment (lower contact pressure), the thinner the loose lift of soil has to be to achieve adequate compaction.

Proper backfilling around the perimeter will reduce the potential for water seepage beneath the structure. Fill against the perimeter of the foundation, within the top 6 inches of subgrade, should consist of clay soils with a PI between 10 and 25. These materials should be placed and compacted in accordance with the recommendations outlined above.

Very hard dolomitic limestone rock was encountered at this site. As a result, high-powered rock excavation equipment, along with rock hammering, sawing, and milling tools, will be necessary for grading, foundation excavations, and/or utility trenches that extend deeper than approximately three feet below existing site grades.

Effective drainage away from the building should be ensured during construction. The soil and any flatwork areas within 10 feet of the building must slope away from the structure to promote proper drainage.

4.7 Construction Observation and Testing Frequency

It is recommended that the following items (as a minimum) be observed and tested by a representative of WES during construction.

Observation:

- Fill placement and compaction.
- Foundation construction and concrete placement.

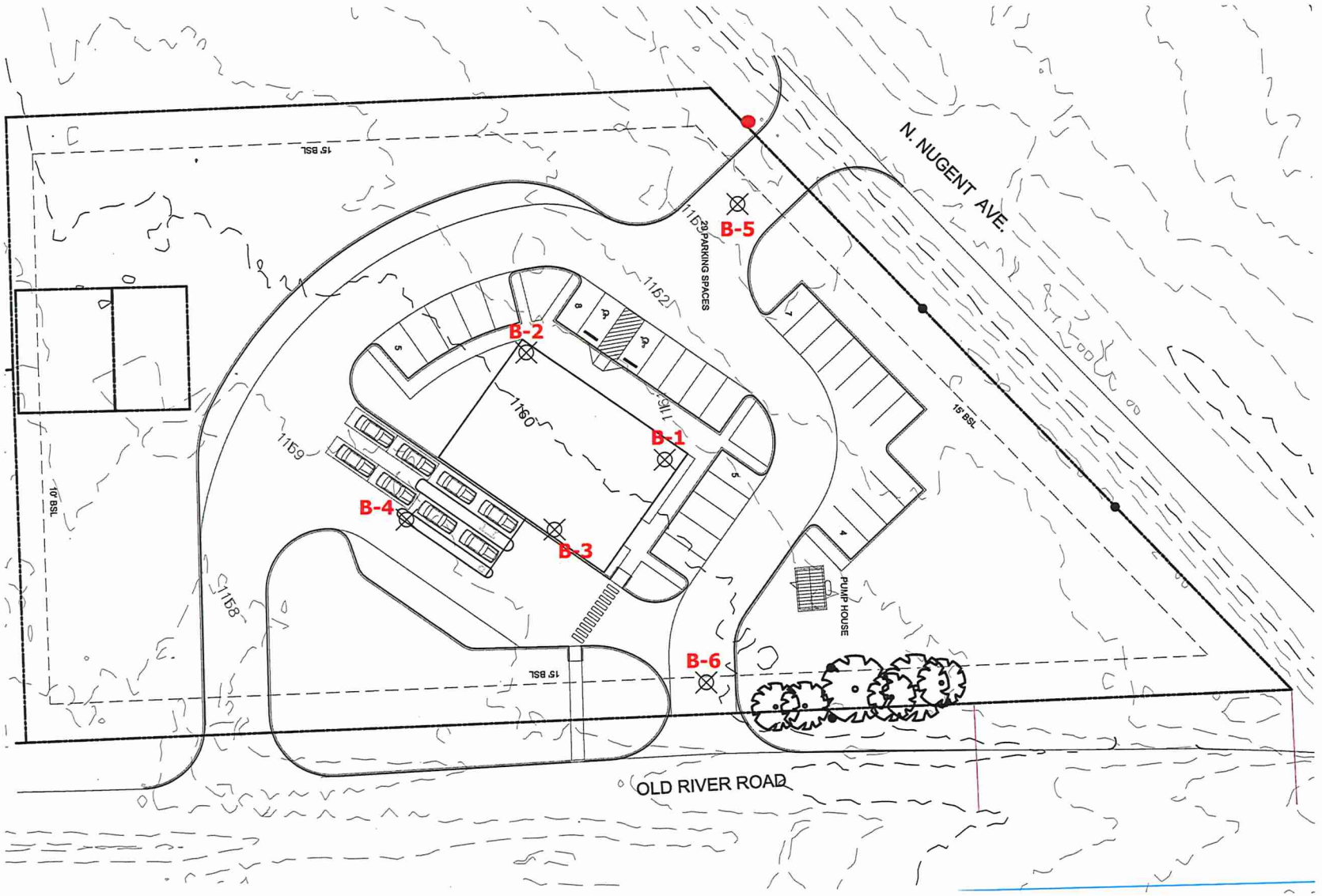
Testing:

- Earthwork
    - Three tests per lift within fills below the building area
    - One test per 5,000 square feet per lift within fills in the paving area
    - One test per 100 linear feet per lift in utility backfill.

(Note: More restrictive requirements may be required by the City, County, or associated entities).

The purpose of the recommended observation and testing is to confirm conformance with the above geotechnical recommendations and specifications for the building foundation.

APPENDIX



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WELLBORN ENGINEERING & SURVEYING
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Kerrville, TX 78028
Phone: 830-217-7100
Texas Registration No. F-7761
wellbornengineering.com

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Daniel Kovacich, P.E.
License # 127402

Plan of Borings for Security State Bank and Trust

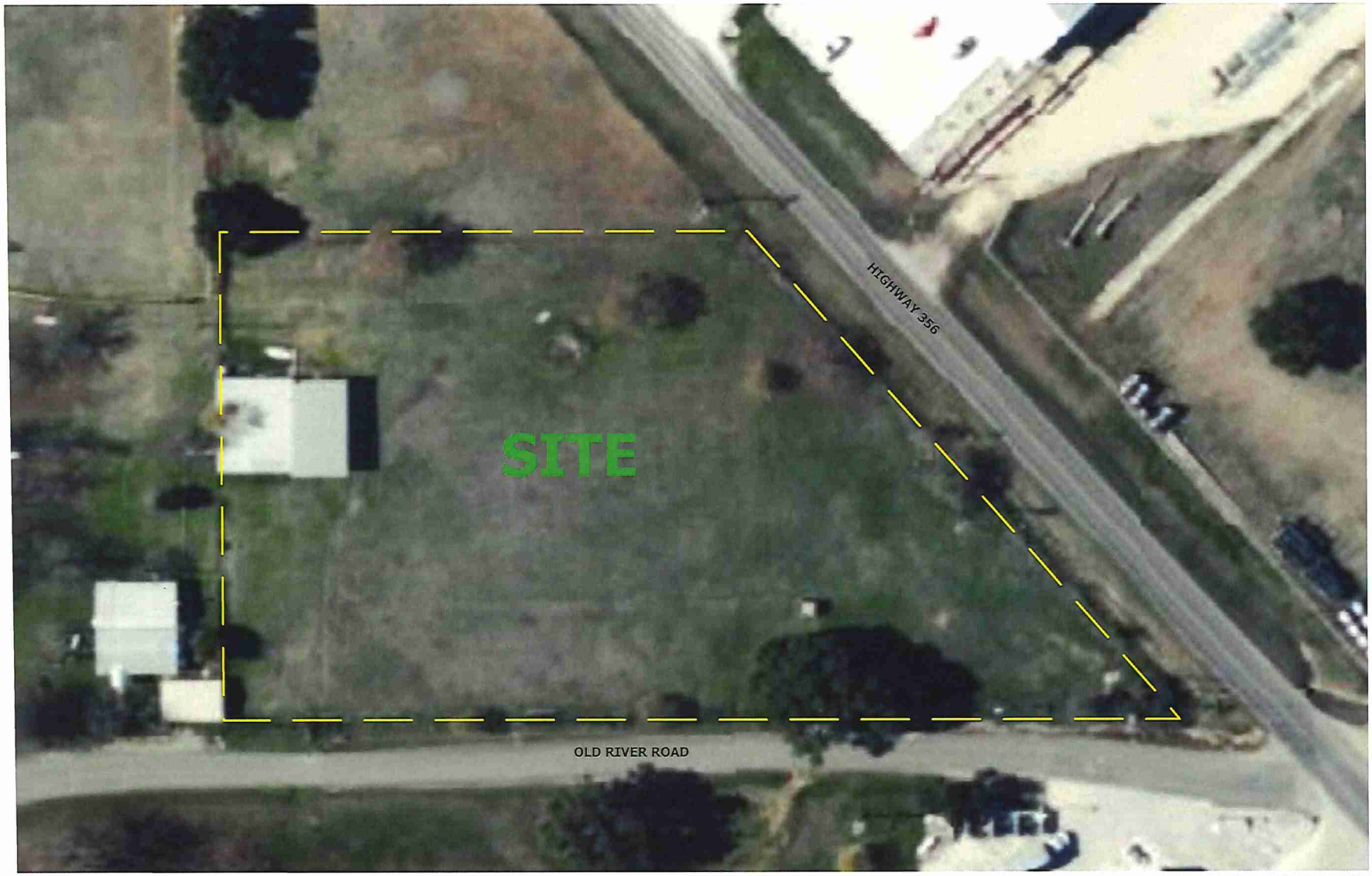
Spur 356 & Old River Road
Johnson City, Texas

Revisions		
No.	Date	Description

Scale
1"=40' for 11x17 Sheet

WEI Project No.
28-084

Exhibit No.
1



Aerial image obtained from Google Earth dated March 2025

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WELLBORN ENGINEERING & SURVEYING
631 Water Street
Kerrville, TX 78028
Phone: 830-217-7100
Texas Registration No. F-7761
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This document is released for interim purposes only. It is incomplete and may not be used for regulatory approval, permit, or construction. Daniel Kovacich, P.E. License # 127402

Site Aerial Photograph for Security State Bank and Trust

Highway 356 & Old River Road
Johnson City, Texas

Revisions No.	Date	Description

Scale
1"=30' for 11x17 Sheet

WCS Project No.
25-084

Exhibit No.

2

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-01

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/04/2026

Ground Elevation: 1161

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penetrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					SANDY FAT CLAY, dark brown, stiff to hard (CH)	N = 15	19.0	52	27	26	61	96
	1158					N = 50/3"	18.9					
					LIMESTONE, tan, very hard, dolomitic							
5						N = 50/0"	2.7					
						N = 50/0"	1.7					
10						N = 50/0"	2.4					
						N = 50/0"	1.9					
15												
						N = 50/0"	3.8					
20					**Boring terminated at 20 feet** Dry during drilling. Dry & Blocked @ 19-1/2' on 05/04/2026.							
25												
30												

GPS Coordinates:
N30.30653° W98.40659°

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-02

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/05/2026

Ground Elevation: 1160.5

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penetrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					FAT CLAY, dark brown, very stiff (CH) -w/ some sand	N = 16	16.8	65	20	45	80	96
	1158				LIMESTONE, tan, very hard, dolomitic	N = 50/2"	12.8					
5						N = 50/0"	1.7					
					-refusal @7.5'	N = 50/0"	2.9					
					Boring terminated at 7.5 feet Dry during drilling. Dry & Blocked @ 7' on 05/05/2026.							
10												
15												
20												
25												
30												

GPS Coordinates:
N30.28553° W98.40676°

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-03

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/04/2026

Ground Elevation: 1159.5

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					FAT CLAY, dark brown, very stiff (CH) -w/ sand and gravel	N = 19	17.4	61	24	37		
	1157				LIMESTONE, tan, very hard, dolomitic	N = 50/0"	10.8				50	77
5						N = 50/0"	5.3					
					-refusal @ 7.5'	N = 50/0"	2.5					
					Boring terminated at 7.5 feet Dry during drilling. Dry & Blocked @ 7' on 05/04/2026.							
10												
15												
20												
25												
30												

GPS Coordinates:
N30.28555° W98.40661°

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-04

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/04/2026

Ground Elevation: 1159

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					SANDY FAT CLAY, dark brown, very stiff (CH)	N = 16	14.0				71	98
	1157.5				LIMESTONE, tan, very hard, dolomitic	N = 50/0"	9.7					
5						N = 50/0"	2.7					
					-refsual @ 7.5'	N = 50/0"	4.7					
					Boring terminated at 7.5 feet Dry during drilling. Dry & Blocked @ 7' on 05/04/2026.							
10												
15												
20												
25												
30												

GPS Coordinates:
N30.28547° W98.40656°

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-05

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/05/2026

Ground Elevation: 1163

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penetrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					SANDY FAT CLAY, dark brown, very stiff (CL)	N = 12	17.8	57	17	40	71	98
	1160				LIMESTONE, tan, very hard, dolomitic	N = 15-50/3"	13.6					
5						N = 50/0"	10.5					
					Boring terminated at 6 feet Dry during drilling.							
10												
15												
20												
25												
30												

GPS Coordinates:
N30.28577° W98.40705°

WELLBORN ENGINEERING & SURVEYING

BORING LOG B-06

Project Number: 26-084

Project Name and Address: Security State Bank & Trust
Highway 356 & Old River Crossing
Johnson City, Texas

Date Completed: 05/05/2026

Ground Elevation: 1160

DEPTH (FT)	ELEVATION (FT)	WATER LEVEL	SAMPLE	GRAPHIC LOG	DESCRIPTION OF STRATA	FIELD TEST RESULTS (P-Pocket Penrometer, N - SPT/Blow Count, TC - TCP/Blow Count)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT (LL)	ATTERBERG LIMITS: PLASTIC LIMIT (PL)	ATTERBERG LIMITS: PLASTICITY INDEX (PI)	PERCENT PASSING NO. 200 SIEVE	PERCENT PASSING NO. 4 SIEVE
					SANDY LEAN CLAY, dark brown, very stiff (CL)	N = 11	16.0	41	17	24	72	98
	1156.5				LIMESTONE, tan, very hard, dolomitic	N = 30-50/2"	14.9				65	91
5						N = 50/0"	3.9					
					Boring terminated at 6 feet Dry during drilling.							
10												
15												
20												
25												
30												

GPS Coordinates:
N30.28574° W98.40632°

WELLBORN ENGINEERING & SURVEYING

SYMBOLS AND TERMS USED ON BORING LOGS

SAMPLER TYPE

- Shelby Tube
- Standard Penetration Test (SPT) / Split Spoon
- Disturbed (Grab Sample)
- Rock Core

WATER LEVEL

- Water level at time of drilling
- 10-03-25 — Subsequent water level and date

TERMS DESCRIBING CONSISTENCY OF SOIL AND ROCK

COARSE GRAINED SOILS (More than 50% retained on No. 200 Sieve)		FINE GRAINED SOILS (More than 50% passing the No. 200 sieve)			ROCK	
SPT N-Values (blows / foot)	Relative Density	SPT N-Values (blows / foot)	Pocket Pentrometer (tons / ft^2)	Relative Density	Rock Quality Designation (RQD)	
0 - 4	Very Loose	0 - 2	0 - 0.25	Very Soft	RQD (%)	Rock Quality
4 - 10	Loose	2 - 4	0.25 - 0.50	Soft	0 - 25	Very Poor
10 - 30	Medium Dense	4 - 8	0.50 - 1.0	Medium Stiff	25 - 50	Poor
30 - 50	Dense	8 - 15	1.0 - 2.0	Stiff	50 - 75	Fair
50 +	Very Dense	15 - 30	2.0 - 4.0	Very Stiff	75 - 90	Good
		30 +	4.0 +	Hard	90 - 100	Excellent

SOIL SYMBOLS AND DESCRIPTION

- LEAN CLAY (CL) (LL<50)
- FAT CLAY (CH) (LL>50)
- SANDY CLAY (CL-CH)
- SAND (SP-SW)
- CLAYEY SAND (SC)
- SILTY SAND (SM)
- GRAVELLY CLAY or CLAYEY GRAVEL
- (weathered) LIMESTONE (unweathered)

TERMS CHARACTERIZING SOIL AND / OR ROCK STRUCTURE

calcareous	- containing appreciable quantities of calcium carbonate
well graded	- having wide range in grain sizes and substantial amounts of all intermediate particles sizes
poorly graded	- predominately of one grain size or having a range of sizes with some intermediate size missing
interbedded	- composed of alternate layers of different soil types
severely weathered (SWLS)	- most minerals somewhat decomposes ; much softer than fresh rock ; texture becoming indistinct but fabric and structure preserved
dolomitic	- contains appreciable quantities of magnesium carbonate alongside calcium carbonate; characterized by increased hardness, higher density

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SECTION 011000 - 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. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Work under separate contracts.
5. Future work.
6. Purchase contracts.
7. Owner-furnished products.
8. Contractor-furnished, Owner-installed products.
9. Access to site.
10. Work restrictions.
11. Specification and drawing conventions.

B. Related Requirements

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: New Branch Office, Johnson City Branch.

1. Project Location: 622 N. Nugent Avenue, Johnson City, Texas 78636

B. Owner: Security State Bank and Trust, 201 W. Main, Fredericksburg, Texas 78624

1. Owner's Representative: Caleb Elrod

C. Architect: Chesney Morales Partners, Inc.

1. Address: 4901 Broadway Suite 250, San Antonio, Texas 78209

2. Project Architect: Frederick F. “Tex” Liedtka

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Civil Engineer: Cornett Engineering, Mark Cornett, P.E.

2. Structural Engineer: AXIS Structural, Mike Bratten, P.E.

3. MEP Engineers: EEA Consulting Engineers, Ryan Royal, P.E.

4. Landscape: C2 Landgroup, Chad Stranhan, Landscape Architect.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Construction of a New Branch Office; Requirements including all site improvement

B. Type of Contract: Lump Sum

1. Project will be constructed under a single prime contract.

1.5. WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by the Owner.

B. Preceding Work: Owner may perform construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

C. Concurrent Work: Owner may perform construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

D. Subsequent Work: Owner may perform additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

1.6 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. Preceding Work: Owner may award separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

C. Concurrent Work: Owner may assign to Contractor separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

D. Subsequent Work: Owner may award separate contract(s) for additional work to be performed at site following Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

1.7 PURCHASE CONTRACTS

A. General: Owner may negotiate purchase contracts with suppliers of material and equipment to be incorporated into the Work. Owner may assign these purchase contracts to Contractor. Include costs for purchasing, receiving, handling, storage if required, and installation of material and equipment in the Contract Sum, unless otherwise indicated.

1.8 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated as indicated in the equipment schedule. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

1.9 CONTRACTOR-FURNISHED, OWNER-INSTALLED PRODUCTS

A. Contractor shall furnish products indicated in the equipment schedule. The Work includes unloading, handling, storing, and protecting Contractor-furnished products as directed and turning them over to Owner at Project closeout.

1.10 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: 7:00 a.m. to 7:00 p.m.
2. Early Morning Hours: No earlier than 5:00 AM
3. Hours for Utility Shutdowns: As approved by Architect or Owner.
4. Hours for Concrete Placement: No earlier than 5:00 AM

C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to site or adjacent property.

1. Notify Architect and Owner not less than five days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Controlled Substances: Use of tobacco products and other controlled substances on Project Site is not permitted.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by the Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 011600 - CONTRACTOR REQUIREMENTS

The Bidding and Contract Requirements and Division 0 1 - General Requirements, of the specifications apply to this work.

INTERPRETATION.

The following paragraphs contain requirements that apply to the overall accomplishment of the Work. Where specified action is required by this Section, if it is the Contractor's responsibility to perform or to assign such requirement to a Subcontractor and to enforce the performance of his assignments.

COORDINATION BETWEEN TRADES:

The Contractor is responsible for coordination of Work between building trades, to include the scheduling and sequencing of work, sharing of access to workspaces, installations, protection of each other's work, cutting and patching, tolerances, cleaning, selections for compatibility, preparation of coordination drawings, inspections, tests, and temporary facilities and services. The Contractor shall fully inform each Trade or Subcontractor of the relationship of his work to other work and require each to make necessary provisions for the requirements of such other work. No additional compensation for extra work incurred through the lack of cooperation and coordination between various Trades and Subcontractors shall be allowed.

ACCEPTANCE OF PRIOR WORK:

The Contractor shall require that each Trade or Subcontractor whose work is executed in relation to prior work shall carefully inspect this prior work and submit written notice of any defects, improper workmanship or materials or other conditions that would affect the satisfactory execution and permanency of his work. No further work shall be executed until such defects or conditions have been corrected or an agreement reached with the Owner regarding defects which may develop due to conditions so noted. The absence of any such notification shall be construed as an acceptance by these Trades or Subcontractors of all prior related work, and later failure of or claims of defects in this work shall not in any way relieve these Trades or Subcontractors from responsibility for correcting their work,

PROTECTION:

The Contractor shall assume the responsibility for initiation and maintenance of the requirements specified under 'Security and Protection Facilities Installation’ in Section 015000. The General Contractor is to install perimeter construction fencing at the time of mobilization.

CLEANING AND PROTECTION OF WORK IN PROGRESS:

During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Contractor shall apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion' otherwise clean and perform maintenance on newly installed work as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects. Prior to the initial startup of building A/C system, the Contractor must have installed, on top of each return air grills, a polyester or fiberglass: construction filter, to protect the ductwork and system during construction. These construction filters shall be changed every two (2) weeks for the duration of construction. If the ductwork is left unprotected, the Contractor will be responsible for reimbursing the Owner for the expense of cleaning and reconditioning the A/C ducts and unit.

REPAIR OF DAMAGE:

Contractor shall assume responsibility for any loss or damage caused by these operations or any Trade to the Work, or to materials, equipment, to adjacent property and existing structures, and make good any loss, damage, or injury without cost to the Owner. (See Supplementary Conditions covering Liability and Property Insurance).

CONSTRUCTION LOADING:

General: Concrete slabs on grade have not been designed for heavy loading. Do Not place moving loads directly on these slabs, unless authorized in writing by the Structural Engineer.

Slabs on Grader Do not subject slabs on grade to excessive loading by shoring, storage of materials or operation of construction equipment unless adequately protected by planking. Maintenance of slabs in good condition is the responsibility of the Contractor, who shall remove all damaged areas of such slabs and replace them with new work at no cost to Owner.

VERIFICATION OF MEASUREMENTS:

Before ordering any material or performing any work, Contractor shall verify measurements of the Work and be responsible for the correctness of same. Give notification to A/E of any discrepancy which may be found before proceeding with the work. No extra compensation shall be allowed on account of difference between actual dimensions and the measurements indicated on the Drawings. The Architect shall have the right to make minor adjustments to his dimensions without any liability to the Contractor.

SECURITY:

Conform to requirements of public laws, ordinances, regulations, and the requirements of insurance carriers concerning security of the site while work is in progress as well as when (and if) it has been suspended. The Contractor shall secure all the construction area once construction has started in that area.

INFECTIOUS DISEASE SAFETY

Conform to requirements of public laws, ordinances, regulations, and the requirements including National, State and Local infectious disease mandates and protocols such as: screening, temperature testing, wearing appropriate PPE's and safe space distancing.

DOCUMENTS AT THE SITE:

Keep one reference copy of each Drawing, Specification, Addenda, Change Order and other Modification and each approved Shop Drawing at the site. Maintain them in good order. Mark the Drawings and Specifications by note to record at the time at occurs each change made during construction.

EXISTING UTILITIES:

Connection to existing utilities shall be fully coordinated with the City/county and the appropriate utility company.

The Contractor shall notify the city utility affected that the necessary manpower and materials are on hand and that the tie-in can be completed as scheduled. The shutdown is to be scheduled with the agreement of the Owner, City, and the Contractor. The Contractor or his licensed Sub-contractor shall be responsible for opening and closing all valves and switches on all existing utility services. This shall be done without cost to the Owner. In the event of damages to existing utilities the Contractor shall make repairs. If repairs are to utilities shown on Contract Documents, all costs of repairs incurred shall be borne by the Contractor,

END OF SECTION 011600

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

ALTERNATE NO. 1

1. Base Bid: No performance and payment bonds are to be included in the base bid.

2. Alternate: The Contractor is to provide an ADDITIVE alternate price for providing performance and payment bonds.

ADD the sum of _____($_____)
written figures

ALTERNATE NO. 2

1. Base Bid: Scope of Work is to include walls. Storefront units scheduled as K and J; Doors 105, 112, 118, 119 and 120 in the base bid.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price for in lieu of constructing the wall below 9'0" AFF in the areas indicated as Alternate 2 in the floor plans or storefront units scheduled as K AND J, or Doors 105, 112, 118, 119, and 120, to provide a finished cased opening and jambs with blocking to support the installation of modular glass wall panels and doors system by owner's furniture vendor.

DEDUCT the sum of _____(_____)
written figures

ALTERNATE NO. 3

1. Base Bid: Provider color Millwork Teller Desk as detailed in the documents.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price to eliminate the Teller desk in its entirety.

DEDUCT the sum of _____(_____)
written figures

ALTERNATE NO. 4

1. Base Bid: Provider color Millwork Check Desk as detailed in the documents.

2. Alternate: The Contractor is to provide a DEDUCTIVE alternate price to eliminate the Check desk in its entirety.

DEDUCT the sum of _____(_____)
written figures

END OF SECTION 012300

SECTION 012600 - 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 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue 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".

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: The 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. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within Seven (7) days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.

d. 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.
e. Quotation Form: Use forms acceptable to Owner and Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, the Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. 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.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: form acceptable to Architect.

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. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: The 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" will contain a complete description of change in the Work. It also designates the 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 change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - 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 necessary to prepare and process 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 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by the 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 to Architect at earliest possible date, but no later than ten (10) days before the date scheduled for submittal of initial Applications for Payment.

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 G702-1992.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
        1) Labor.
        2) Materials.
        3) Equipment.

4. 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 all principal subcontract amounts in excess of five percent of the Contract Sum.

5. Round amounts to the nearest whole dollar; total shall equal the Contract Sum.
6. 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.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. 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.

10. 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.

11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 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 for by Owner.

    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment. Submit three (3) copies.

D. Application Preparation: Complete every entry on the form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

    1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
    2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
    3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
    4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
    5. Notary seal is not to cover Architect's signature block or date line. Applications submitted will any action block covered by seals, notes or other write throughs will be returned for correction.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies the amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours, one copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
2. Waiver Forms: Submit executed waivers of lien on forms acceptable to the Owner.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. The owner reserves the right to designate which entities involved in the Work must submit waivers.
4. 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.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Schedule of unit prices if any.
7. Submittal schedule (preliminary if not final).

8. List of Contractor's staff assignments.
9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent (100%) completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting the 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.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. 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 meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 General Procedures for Monitoring Payments:

A. Security State Bank and Trust (SSBT) Accounting will be responsible for verifying with the General Contractor (GC) and all sub-contractors that all outstanding debts have been paid during the construction process:

B. The GC will provide the SSBT Accounting department with a listing (to include name of contact, address, phone & email) of all sub-contractors that are to be employed for the construction project. lf any changes are made to this list; the GC will notify SSBT immediately of the change.

C. Within seven (7) business days of receipt of payment for the current month's pay application, the GC will provide SSBT with a complete list of all sub-contractors paid with these monies including, but not limited to:
   1. name.
   2. amount.
   3. check number if applicable .

D. Once this listing is received, SSBT will contact all sub-contractors beginning fourteen (14) business days from the date of draw payment to verify that full payment was received. This may be done by phone, e-mail, etc.

E. If SSBT is unable to verify with the sub-contractor that full payment was received, SSBT will then contact the GC for a copy of the cancelled check to prove payment. All verifications must be completed prior to payment of the next draw.

F. Once all verifications are completed, the SSBT Accounting department will inform Kristin Haas. lf any sub-contractor was not paid in full based on the information received from GC, documentation will be immediately submitted to Planning and Marketing for resolution.

G. Prior to the first pay application, SSBT will arrange a meeting with the general contractor's accounting department to explain details on information required and determine the timeline on which verifications may feasibly be obtained.

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. General coordination procedures.
2. Coordination drawings.
3. Requests for Information (RFIs).
4. Project meetings.

B. Each contractor and subcontractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

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

1.3 DEFINITIONS

A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 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 entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 5 days of Notice to Proceed and start of any construction operations, submit a list of key personnel assignments at Project site. Identify individuals and their duties and responsibilities, list addresses and telephone numbers, office, and cellular telephone numbers and e-mail addresses.

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

1.5 GENERAL COORDINATION PROCEDURES

A. 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, which 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.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate the use of temporary utilities to minimize waste.

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

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

    a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationships of various systems and components.
    b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides coordination of the information and resolution of conflicts between installed components before submitting for review.
    c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    f. Indicate required installation sequences.
    g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
   Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
3. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
4. Slab, Slab Edge, Plumbing, Electrical and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items. Coordinate Plumbing rough-ins with wall locations

and with elements contained within the walls, and Electrical floor outlets and rough-ins with millwork and furniture locations.

5. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts, and electrical distribution equipment.
    c. Fire-rated enclosures around ductwork.

6. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
    b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
    c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
    d. Location of pull boxes and junction boxes dimensioned from column center lines.

C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:

1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
2. File Preparation Format: DWG, Version, operating in Microsoft Windows operating system.

3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format with a “closed” Portable Data File (PDF) format.

4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

    a. Digital Data Software Program: Drawings are available in AutoCAD 2011 in windows Operating system.
        1) Contractor shall execute a data licensing agreement in the form of agreement form acceptable to Owner and Architect.

1.7 CONSTRUCTION PROGRESS DOCUMENTATION

A. Progress Photographs :

1. Photographically document site conditions prior to start of construction operations.
2. Take weekly photographs throughout the entire project. Photographs shall be provided for unrestricted use by Owner.
    a. Indicate photographs demonstrating environmental procedures.
3. Post and or submit minimum 20 photographs on CD, formatted to ISO 9660 via email in hardcopy with each application for payment. Organize photographs by date and description.

1.8 REQUESTS FOR INFORMATION (RFIs)

A. General: 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. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of items needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. 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.

C. RFI Forms: AIA Document G716-2004 or software-generated form with substantially the same content as indicated above, acceptable to Architect.

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

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

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.

f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

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

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

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

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI numbers, including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.

1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting the meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15days after execution of the Agreement.

1. Conduct the conference to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Lines of communications.
    f. Procedures for processing field decisions and Change Orders.
    g. Procedures for RFIs.
    h. Procedures for testing and inspecting.
    i. Procedures for processing Applications for Payment.
    j. Distribution of the Contract Documents.
    k. Submittal procedures.
    l. Preparation of Record documents.
    m. Use of the premises.
    n. Work restrictions.
    o. Working hours.
    p. Owner's occupancy requirements.
    q. Responsibility for temporary facilities and controls.
    r. Procedures for moisture and mold control.
    s. Procedures for disruptions and shutdowns.
    t. Construction waste management and recycling.
    u. Parking availability.
    v. Office, work, and storage areas.
    w. Equipment deliveries and priorities.
    x. First aid.
    y. Security.
    z. Progress cleaning.

4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.

e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to the performance of the Work and reconvene the conference at the earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of record documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Submittal of written warranties.
    d. Requirements for preparing operations and maintenance data.
    e. Requirements for delivery of material samples, attic stock, and spare parts.
    f. Requirements for demonstration and training.
    g. Preparation of Contractor's punch list.

h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Submittal procedures.
j. Coordination of separate contracts.
k. Owner's partial occupancy requirements.
l. Installation of Owner's furniture, fixtures, and equipment.
m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at bi-weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of Project.

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

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

1) Interface requirements.
2) Sequence of operations.
3) Deliveries.
4) Off-site fabrication.
5) Access.
6) Site utilization.
7) Temporary facilities and controls.
8) Progress cleaning.
9) Quality and work standards.
10) Status of correction of deficient items.
11) Field observations.
12) Status of RFIs.
13) Status of proposal requests.
14) Pending changes.
15) Status of Change Orders.
16) Pending claims and disputes.
17) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

    a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with the Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of Project.

    a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
    c. Review the present and future needs of each contractor present, including the following:

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

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

PART 2 - PRODUCTS (Not Used)

PART 2 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013300 - 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 requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
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 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. 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 are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: 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 Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with 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 first complete 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.
    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. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    b. Digital Drawing Software Program: The Contract Drawings are available in Acrobat Portable File (PDF) and AutoCAD 2021.
    c. The contractor shall execute a data licensing agreement in the form of AIA Document C106, Digital Data Licensing Agreement and Chesney Morales CAD Release form.

d. The following digital data files will be furnished for each appropriate discipline:
    1) Floor plans.
    2) Roof Plans
    3) Reflected ceiling plans.
    4) Architectural details and elevations

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. 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.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in the same manner as initial submittal.
3. Resubmittal Review: Allow 15 working days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21calendar days for initial review of each submittal.

    a. Specification Sections requiring sequential review may include but not be limited to structural, electrical, mechanical, and plumbing where dimensions or finish selections are required.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 working days for review of each submittal. The submittal will be returned to the Architect, before being returned to the Contractor.

D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate the name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.

3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of subcontractor.
    g. Name of supplier.
    h. Name of manufacturer.
    i. Submittal number or other unique identifier, including revision identifier.
        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
    j. Number and title of appropriate Specification Section.
    k. Drawing number and detail references, as appropriate.
    l. Location(s) where product is to be installed, as appropriate.
    m. Other necessary identification.

4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

    a. Submit one copy of the submittal to concurrent reviewer in addition to specified number of copies to Architect.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without reviewing submittals received from sources other than Contractor.

    a. Transmittal Form for Paper Submittals: Use AIA Document G810or similar form.
    b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.
        3) Destination (To:).
        4) Source (From:).
        5) Name and address of Architect.
        6) Name of Construction Manager.
        7) Name of Contractor.
        8) Name of firm or entity that prepared submittal.

9) Names of subcontractor, manufacturer, and supplier.
10) Category and type of submittal.
11) Submittal purpose and description.
12) Specification Section number and title.
13) Specification paragraph number or drawing designation and generic name for each of multiple items.
14) Drawing number and detail references, as appropriate.
15) Indication of full or partial submittal.
16) Transmittal number numbered consecutively.
17) Submittal and transmittal distribution record.
18) Remarks.
19) Signature of transmitter.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed 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 the order number. e.g., the first submittal sent would be 001. Then the Specification Section number followed by a decimal point and then a sequential number (e.g., 001-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 001-061000.01. A).

    b. Coordinate with the Architect’s project manager for establishing the numbering system, submittal log format and initial comprehensive list of submittals planned for in the project.

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or other electronic form acceptable to the Owner**,** containing the following information:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name of Construction Manager.
    e. Name of Contractor.
    f. Name of firm or entity that prepared submittal.
    g. Names of subcontractor, manufacturer, and supplier.
    h. Category and type of submittal.
    i. Submittal purpose and description.
    j. Specification Section number and title.
    k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    l. Drawing number and detail references, as appropriate.
    m. Location(s) where product is to be installed, as appropriate.
    n. Related physical samples submitted directly.

o. Indication of full or partial submittal.
p. Transmittal number numbered consecutively.
q. Submittal and transmittal distribution record.
r. Other necessary identification.
s. Remarks.

F. Options: Identify options requiring selection by Architect.

G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

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 or submittal review form.

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 notation from Architect's action stamp or submittal review form.

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. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project and email the PDF copy directly to Architects.

a. The architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Submit electronic submittals via email as PDF electronic files.

a. The architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

3. Action Submittals: Submit three (3) physical samples of materials or finishes. Submit PDF or five (5) paper copies of each submittal unless otherwise indicated. The architect will return four (4) copies. Provide an additional copy where required for review by structural, mechanical, electrical, plumbing or other reviewer.

4. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.

5. Certificates and Certifications Submittals: Provide a statement that includes the signature of the 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. Provide a notarized statement on original paper copy 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. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. 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.

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.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
3. Submit Shop Drawings in the following format:

    a. PDF electronic file.
    b. Five (5) opaque (bond) copies of each submittal. The architect will return four (4) copies. Provide an additional copy where required for review by structural, mechanical, electrical, plumbing or another reviewer.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of applicable Specification Section.
    e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and 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.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. The architect will retain one sample set; the remainder will be returned to Contractor as the project record sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

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.
7. Submit product schedule in the following format:

    a. PDF electronic file.
    b. Three paper copies of product schedule or list unless otherwise indicated. The architect will return two copies.

E. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

G. Application for Payment and Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

K. 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.

L. 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.

M. 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.

N. 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.

O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Q. 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.

R. 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.

S. 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.

T. 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.

U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on the 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.

V. 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.

W. 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.

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

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies 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.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. 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. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. The architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

1. Reviewed: No corrections required. Comments for clarification may be provided as indicated on Architect's stamp or submittal review form.

2. Furnish as Corrected: Corrections required as indicated on Architect's stamp or submittal review form. Unless noted otherwise, no resubmittal is required if corrections are of a minor nature.

3. Revise and Resubmit: Corrections or changes required as indicated on Architect's stamp or submittal review form. A resubmittal is required to correct non-complying products, or elements of shop drawings.

4. Rejected: The product or shop drawing must be corrected to be in compliance with the drawings and specifications. A new submittal is required as indicated on Architect's stamp or submittal review form.

B. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. The architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 013300

SECTION 014000 - 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. The 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 the Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, 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 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

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.
    a. The Architect may at his discretion require changes and additional paint color samples applied and other items modified to meet esthetic requirements

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 an NRTL(Nationally Recognized Testing Laboratory), an NVLAP (National Voluntary Laboratory Accreditation Program), 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. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. 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).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five 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.

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 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

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. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit a copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
1. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

D. 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.

E. 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 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, 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 the 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.

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 the 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 the 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 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 the 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 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.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

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.
2. Notify Architect seven 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 days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

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. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. 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 24 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. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

F. Testing Agency Responsibilities: Cooperate with Architect, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect**,** 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. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
2. Coordinate activities included in various Sections to assure efficient and orderly installation of each component. Coordinate operations included under different Sections that are dependent on each other for proper installation and operation.
   a. Interior finishes: Schedule construction operations with consideration for indoor air quality.
   b. Commissioning: The project will have selected building systems commissioned as specified in Section 01 91 00 – Commissioning. Coordinate prefunctional tests and start-up testing with commissioning.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect**,** and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
7. Retesting and reinspecting corrected work.

B. Under Ground Utilities inspections and Verification: This section applies to all underground pipes, landscape, utilities, conduits, and sleeves.

1. The General Contractor is to hold a preconstruction conference prior to beginning underground utility work and invite each subcontractor involved. Because of the critical nature to subject the Contractor will include this as an item in the sub meeting. The general contractor will be responsible to make sure No person shall be allowed to begin this work without full understanding the rules and ramifications.

2. The General Contractor is to oversee all underground utility work from start to finish.

3. The Superintendant will confirm the exact location and path on the site before excavation begins. The General Contractor shall work closely with the Civil Engineer and parties identified in the preconstruction meeting with the inspection schedule and provide a 2 day look ahead and 4-hour advanced notification so work can be accomplished in a smooth and orderly fashion.

4. The Superintendent will inspect and confirm the depth, bedding, level, and plumb per specifications and will then notify the Civil Engineer and other design professionals responsible for review and oversight to review and approve work in place prior to backfilling. NO UNDERGROUND WORK IS TO BE COVERED WITHOUT APPROVAL FROM CIVIL ENGINEER, OTHER RESPONSIBLE ENGINEERS, REQUIRED REGULATORY INSPECTIONS AND GENERAL CONTRACTOR. WORK INSTALLED AND COVERED WITHOUT THIS APPROVAL WILL BE REMOVED AND REINSTALLED TO AT CONTRACTORS EXPENSE. UNCOVERING LINES FOR INSPECTIONS AND THEN RECOVERING WILL NOT BE ALLOWED – NO EXCEPTIONS.

5. The contractor is responsible that back fill is installed per specification.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. Terracon.

3.2 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to 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 Architect's reference during normal working hours.

3.3 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. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.
2. Division 31 Section "Dewatering" for disposal of ground water at Project site.
3. Division 32 Section "Asphalt Paving" for construction and maintenance of asphalt pavement for temporary roads and paved areas.
4. Division 32 Section "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 USE CHARGES

1.4 General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Contractor’s construction forces, Architect, testing agencies, and authorities having jurisdiction.

A. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.

B. Water Service: Pay water-service use charges for water used by all entities for construction operations.

C. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.5 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

E. 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:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.6 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, TDLR-TAS and ICC/ANSI A117.1.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of 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.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails, with galvanized barbed-wire top strand.

B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil (0.25-mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).

E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep the office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 8 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
6. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless 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."

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shut off. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to the existing system indicated as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for the use of construction personnel. Comply with the requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

G. Electric Power Service: Connect to electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.
2. Connect temporary service as required.

H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install two telephone line(s) for each field office.

1. Provide additional telephone lines for the following:

2. At each telephone, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.

d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

J. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas as indicated within construction limits on Drawings.

1. Provide dust-control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in the same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 31 Section "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proof-rolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Division 32 Section "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform the public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Division 01 Section "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

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 2017 EPA Construction General Permit (CGP) as modified in June 2019 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 during the course 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. Under no circumstances will runoff be allowed to cross any active public or private street or highway. Contractor will bear all costs to install barriers, berms, piping, and other structures to assure no water.

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. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

G. Site Enclosure Fence: Before construction operations begin, furnish, and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations as indicated on Drawings.
2. Maintain security by limiting the number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

H. 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 the end of each workday.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. 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.

K. 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. 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.

3.5 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 airborne 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 the 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 a 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 permanent HVAC system 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 can not be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in the use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.

D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

E. Termination and Removal: Remove each temporary facility when the need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. 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. The owner reserves the right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. 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. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

B. Related Requirements:

1. Division 01 Section "Summary" for limits on use of Project site.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Division 02 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.
5. Division 07 Section "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate the length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated. The Contractor is not to use the Owner's Surveyor.

B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch any structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Mechanical systems piping and ducts.

f. Control systems.
g. Communication systems.
h. Fire-detection and -alarm systems.
i. Conveying systems.
j. Electrical wiring systems.
k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

a. Water, moisture, or vapor barriers.
b. Membranes and flashings.
c. Exterior curtain-wall construction.
d. Sprayed fire-resistive material.
e. Equipment supports.
f. Piping, ductwork, vessels, and equipment.
g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

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 and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing 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, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping, underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply and enforce applicable National, State and Local infectious disease mandates and protocols including screening, temperature testing, wearing appropriate PPE’s and work area safe space distancing.

B. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

C. 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.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. 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 according to requirements in Division 01 Section "Project Management and Coordination."

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 the Architect promptly.

B. General: Engage a professional engineer (not the Owner's engineers) 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 layout 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 Architect.

F. Under Ground Utilities Procedures and Verification: THIS SECTION APPLYS TO ALL PIPE, WIRES, SLEEVES BARRIED IN THE GROUND. The General Contractor is to hold a preconstruction conference prior beginning underground utility work and invite each subcontractor involved. Because of the critical nature to subject the Contractor will include this as an item in the sub meeting. The general contractor will be responsible to make sure No person shall be allowed to work without full understanding the rules. The General Contractor is to oversee all underground utility work from start to finish. The Superintendant will confirm the exact location and path on the site before excavation begins. The Superintendant will confirm the depth, bedding, level and plumb and will notify the Civil Engineer and other design professionals responsible for review and oversight to review and approve. NO UNDERGROUND WORK IS TO BE COVERED WITHOUT APPROVAL FROM CIVIL ENGINEER, OTHER RESPONSIBLE ENGINEERS, REQUIRED REGULATORY INSPECTIONS AND GENERAL CONTRACTOR. WORK INSTALLED AND COVERED WITHOUT THIS APPROVAL WILL BE REMOVED AND REINSTALLED TO AT CONTRACTORS EXPENSE – NO EXCEPTIONS. The contractor is responsible that back fill is performed per specification. The location of the utilities will be surveyed and recorded in the as- built document. The contractor is to establish and maintain flagged markers through the duration of the project. No heavy equipment will be allowed over areas marked- NO EXCEPTIONS. Clean outs are required at the end of section of drainage prior to joining with other sections. Each clean out is to be permanently labeled, identified, and charted in the as-built documentation. Clean outs are to be minimum 6” inside diameter and allow for easy observation. All utilities entering the building below grade are to be slopped to drain away from the building. The point of penetration is to be caulked, sealed, and flashed with the underground water proofing system that surrounds the building. The first three feet of trench outside of the building is to be plugged with flowable fill. All data and communication conduits are to be gel filled.

3.4 FIELD ENGINEERING

A. Identification: Owner or Owner’s agent will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of 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.

C. Benchmarks: Establish and maintain a minimum of four permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

E. Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include in the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements, and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize the space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches (2440 mm in occupied spaces and [90 inches (2300 mm)] in unoccupied spaces.

B. Comply with the 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 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. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering, and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

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 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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.

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 ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

K. Compliance: The Contractors are to keep a clean, orderly, and safe work area. After (1) one verbal notification from the Owner, Architect, or the General Contractor, a sub-contractor fails to maintain their work area they will be charged for the expense of a third party to perform the clean up duty.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."

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. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturers' written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - 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 and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Division 01 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
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. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 ACTION SUBMITTALS

A. Product Data: For cleaning agents.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items 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.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

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. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit sustainable design submittals required in Division 01 sustainable design requirements Section and in individual Division 02 through 33 Sections.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of **10** days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. A certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify the Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. 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.

1. Organize list of spaces in sequential order, starting with exterior areas, Drive Thru Teller, and then proceeding with interior rooms in rough numeric order of room numbers.
2. Organize items applying to each space by major element, including categories for door, ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. Autodesk Plan Grid document with notations and or photos indicating location of the occurrence on the plan documents and separate summary list of the outstanding issue.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds 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 (215-by-280-mm) paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of the Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

D. Provide additional copies of each warranty to include in the operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the 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.

B. Attic Stock: Provide the owner with attic stock material and items identified in the documents at the quantities listed. Attic stock items are to be packaged in manufacture’s un-opened cases or packaging. This packaging is to be clearly marked with the Project Name, product description and product designation as identified in the Room Finish legend.
1. Provide the owner with an itemized spread sheet showing:
    a. Materials using the room finish legend designation;
    b. Manufacture, product description, series name, pattern number, color, and size;
    c. Location by Room numbers where it is installed;
    d. Distributor name, location, current contact information.

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: 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**,** elevator 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.

1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
q. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls

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. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that 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.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. 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 017700

SECTION 017823 - 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. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:
1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

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. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. The architect will comment on whether the content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. 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.
   b. Enable inserted reviewer comments on draft submittals.

2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. The architect will return two copies.

C. Initial Manual Submittal: Submit a draft copy of each manual at least 30 days before commencing demonstration and training. The architect will comment on whether the general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. The architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of the system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. 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.

B. 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.
7. Name and contact information for Architect.
8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. 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. If operation or maintenance documentation requires more than one volume to accommodate data, include a comprehensive table of contents for all volumes in each volume of the set.

D. 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.

E. Manuals, Electronic Files: Submit 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 the manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

F. Manuals, Paper Copy: Submit 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-by-11-inch (215-by-280-mm) 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 "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
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-by-11-inch (215-by-280-mm) 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 the manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

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.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.

7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

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.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

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, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with the name and telephone number of the 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.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. 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. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. 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.

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 operation and 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 017823

SECTION 033016 - UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.1 SUMMARY

A. Products supplied under this section:
   1. Vapor barrier, seam tape, and mastic for installation under concrete slabs.

B. Related sections:
   1. Division 03 - Concrete
   2. Division 07 - Thermal and Moisture Protection.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
   3. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
   4. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
   5. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 SUBMITTALS

A. Quality control/assurance:
   1. Summary of test results as per paragraph 8.3 of ASTM E 1745.
   2. Manufacturer’s samples, literature.
   3. Manufacturer’s installation instructions for placement, seaming and penetration repair instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Vapor barrier must have all of the following qualities:
   1. Permeance of less than 0.01 Perms as tested in accordance with ASTM E 1745 Section 7.
   2. Other performance criteria:
      a. Strength: ASTM E 1745 Class A.

B. Vapor barrier products:
   1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries

2.2 ACCESSORIES

A. Seam tape:
   1. Stego Tape by Stego Industries
B. Vapor-proofing mastic:
   1. Stego Mastic by Stego

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that base material is approved by Architect or Geotechnical Engineer.
   1. Level and compact base material.

3.2 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
   1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.
   2. Lap vapor barrier over footings and/or seal to foundation walls.
   3. Overlap joints six (6) inches and seal with manufacturer's tape.
   4. Seal all penetrations (including pipes) per manufacturer's instructions.
   5. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
   6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area six (6) inches and taping all sides with tape.

END OF SECTION 033016

SECTION 033880 - CONCRETE IN-SITU RELATIVE HUMIDITY AND pH TESTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide in-situ concrete relative humidity and surface pH testing to all concrete specified to be covered with floor coverings.

1.2 RELATED SECTIONS

A Section 096519 - Resilient Tile Flooring.

1.3 REFERENCES

A. ASTM F-2170-02– Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-Situ Probes
B. ASTM F-710-03 – Standard Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
C. ASTM F 1869-04 – Standard Test Method for Measuring Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
D. ICR Publication No. 310.2–1997 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
E. ASTM F2659 Standard Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter

1.4 SUBMITTALS

A. Report all test results in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity and pH levels.
B. List test locations on chart and show same on 8 ½ x 11 site map (when such map is made available to testing agency)
C. Deliver results in duplicate for distribution to Architect and General Contractor.

1.5 QUALITY ASSURANCE

A. Digital “Reader” and calibrated relative humidity sensors
   1. Factory-calibrated “Smart Sensors” using CMOS Sens® technology.
   2. NIST-traceable factory calibration
B. Wide range pH paper and distilled or de-ionized water.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Rapid RH™ relative humidity and temperature sensor kit as manufactured by Wagner Electronics, or equal.

Wagner Meters
326 Pine Grove Road
River, Oregon 97537 USA
844-847-3793
info@wagnermeters.com

B. pH test paper as manufactured by Micro Essential Laboratory, or equal.

PART 3 - EXECUTION

3.1 Quantification of Relative Humidity at 40% of Concrete Thickness

A. The test site should be maintained at the same temperature and humidity conditions as those anticipated during normal occupancy. These temperature and humidity levels should be maintained for forty-eight (48) hours prior and during test period. When a building is not under HVAC control, a recording hygrometer or data logger shall be in place recording conditions during the test period. A transcript of this information must be included with the test report.

B. The number of in-situ relative humidity test sites is determined by the square footage of the facility. The minimum number of tests to be placed is equal to three (3) in the first one thousand (1,000) sq. ft. and one (1) per each additional one-thousand 1,000 square feet.

C. Determine the thickness of the concrete slab, typically from construction documents.

D. Utilizing a roto-hammer, drill test holes to a depth equal to forty percent (40%) of the thickness, i.e, two (2") deep for a five (5") thick slab, or 1 ½" deep for a four (4") Elevated structural slab (not poured in pans) should be tested at a depth equal to twenty percent (20%) of its thickness. Hole diameter shall not exceed outside diameter of the probe by more than 0.04." Drilling operation must be dry.

E. Vacuum and brush all concrete dust from test hole.

F. Insert a relative humidity probe (sensor) to the full depth of test hole. Place cap over probe.

G. Permit the test site to acclimate, or equilibrate for 1-2 hours prior to taking relative humidity readings.

H. Remove the cap, insert the cylindrical reading device, and press the button on the device to obtain reading from the in-situ probe.

I. Read and record temperature and relative humidity at the test site.

3.2 QUANTIFYING pH LEVEL

A. At or near the relative humidity test site perform pH test.
   1. Place several drops of water onto the concrete surface to form a puddle approximately one (1”) in diameter.
   2. Allow the water to set for approximately sixty (60) seconds
   3. Dip the pH paper into the water and remove immediately, compare color to chart provided by paper supplier to determine pH reading

B. Record and report results.

3.3 SCHEDULE

A Provide one (1) test for each one thousand (1,000) square feet or a minimum of three (3) locations whichever is greater.

END OF SECTION 033880

SECTION 044300 - STONE MASONRY

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 the following applications of stone masonry:

1. Anchored to concrete backup.

B. Related Sections:
1. Division 04 - Unit Masonry: For concealed flashing and veneer anchors.
2. Division 07 - Sheet Metal Flashing and Trim: For exposed sheet metal flashing.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For stone varieties proposed for use on Project, include test data indicating compliance with physical properties specified or required by referenced ASTM standards.

B. Samples for Initial Selection: Colored mortar and other items involving color selection.

C. Samples for Verification:

1. For each stone type indicated. Include at least four samples in each set for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples will establish the standard by which stone provided will be judged.
2. For each color of mortar required

D. Masonry Accessories: Provide manufacture’s product information for:
1. Masonry Ties
2. Weeps
3. Mortar Nets
4. Masonry Flashing
5. Expansion/Control Joint System
6. Masonry Sealer

E. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, sources of supply, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

F. Qualification Data: For qualified Installer.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.

B. Source Limitations for Stone: Obtain stone, from one quarry with resources to provide materials of consistent quality in appearance and physical properties.

C. 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.

D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of a typical wall area as shown on Drawings.
2. Build mockups for typical exterior wall in sizes approximately 48 inches (1200 mm) long by 60 inches (1500 mm) high by full thickness, including face and backup wythes and accessories.
    a. Include a sealant-filled joint at least 16 inches (400 mm) long in mockup.
    b. Include through-wall flashing installed for a 24-inch (600-mm) length in corner of mockup approximately 16 inches (400 mm) down from top of mockup, with a 12-inch (300-mm) length of flashing left exposed to view (omit stone masonry above half of flashing).
    c. Include, veneer anchors, flashing, and weep holes in exterior masonry-veneer wall mockup.
3. Protect accepted mockups from the elements with weather-resistant membrane.
4. Approval of mockups is for color, texture, and blending of stone; relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship.

    a. Approval of mockups is also for other material and construction qualities Architect specifically approves in writing.
    b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Pre-installation Conference: Conduct conference at project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.

B. Stain Prevention: Immediately remove mortar, and soil to prevent them from staining the face of stone masonry.

1. Protect base of walls from rain-splashed mud and mortar splatter by covering spread on the ground and over the wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at end of each day to prevent rain from splashing mortar and dirt on completed stone masonry.

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 stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1-02/ASCE 6-02/TMS 602-02.

1. Cold-Weather Cleaning: Only install masonry or use liquid cleaning methods when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.7 COORDINATION

A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

PART 2 - PRODUCTS

2.1 LIMESTONE

A. ST-1) Cordovia Cream Limestone
   1. Products: Subject to compliance with requirements, provide the following
      a. Lueders Quarry
   2. Classification: Type II Medium-Density.
   3. Density: 135 lb/ft^3 (2160 kg/m^3)
   4. Absorption: 7.5% by weight maximum
   5. Compressive Strength: 4000 psi (28MPa) minimum
   6. Modulus of Rupture: 500 psi (3.45 Mpa
   7. Description: Oolitic limestone.
   8. Facing: Chopped face and ends, cut on top and bottom as noted on the drawings.
   9. Thickness: Nominal 4 inches minimum, 5 inches maximum.
   10. Patten and sizes: as described in the drawings. Percentage of each range to be as selected by the Architect.
   11. Color: As selected by Architect from range of colors in formation noted above.

B. Suppliers
   1. I-10 Stone Source
      7193 Heuermann Road,
      San Antonio, TX 78256
      (210) 698-0051

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in stone masonry mortar.

   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; True Tone Mortar Colors.
      b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
      c. Solomon Colors; SGS Mortar Colors.

D. Aggregate: ASTM C 144 and as follows:

1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 (1.18-mm) sieve.
2. White Aggregates: Natural white sand or ground white stone.
3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.

    a. Match Architect's sample.

E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

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. Euclid Chemical Company (The); Accelguard 80.
    b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Morset.
    c. Sonneborn, Div. of Degussa Building Systems; Trimix-NCA.

F. Water: Potable.

2.3 VENEER ANCHORS

A. Materials:

1. Hot-Dip Galvanized-Steel Wire: ASTM A 82, with ASTM A 153/A 153M, Class B-2.

B. Adjustable, Screw-Attached Veneer Anchors: Units consisting of a wire tie section and a metal anchor section that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over Concrete Panel or sheathing to metal studs, and as follows:

1. Products: Subject to compliance with requirements, provide the following
    a. Heckmann Building Products Inc.; Pos-I-Tie
        1) No. 75 POS-I-TIE Concrete barrel Screws
        2) No. 75 POS-I-TIE Self-Drilling Steel Stud Screw

2. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).
3. Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing.
4. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.188-inch-(4.8-mm-) diameter, hot-dip galvanized steel wire.

2.4 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing: For flashing not exposed to the exterior, use one of the following unless otherwise indicated:

1. Copper-Laminated Flashing: 5-oz. /sq. ft. (1.5-kg/sq. m) copper sheet bonded with asphalt between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

    a. Products: Subject to compliance with requirements, provide the following:
        1) York Manufacturing, Inc.; York Copper Fabric Flashing: Multiflash

2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch (1.0 mm).

    a. Products: Subject to compliance with requirements, provide one of the following
        1) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
        2) Polyguard Products, Inc.; Polyguard 300.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane.

B. Dampproofing: Two-part self curing synthetic rubber based dampproofing free of solvents, bitumen, and isocyanates complying with ASTM C 836.

    a. Products: Subject to compliance with requirements, provide the following:
        1. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Liquid.

C. Weep Hole/Vent Products: Use the following unless otherwise indicated: Use one of the following

1. Wicking Material: Absorbent rope, made from cotton or UV-resistant synthetic fiber, 1/4 to 3/8 inch (6 to 10 mm) in diameter, in length required to produce 2-inch (50-mm) exposure on exterior and 18 inches (450 mm) in cavity behind stone masonry. Use only for weep holes.
2. Mesh Weep Holes/Vents: Free-draining mesh; made from polyethylene strands, full width of head joint and 2 inches (50 mm) high by thickness of stone masonry; in color selected from manufacturer's standard.

    a. Products: Subject to compliance with requirements, provide the following [
        1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Provide one of the following configurations:

a. Strips, full-depth of cavity and 10 inches (250 mm) wide, with dovetail shaped notches 7 inches (175 mm) deep that prevent mesh from being clogged with mortar droppings.

2. Products: Subject to compliance with requirements, provide the following:
a. Mortar Net USA, Ltd.; Mortar Net.

2.6 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

1. Manufacturers: Subject to compliance with requirements, provide the following:
a. Prosoco, Inc.

2.7 MASONRY WEATHER SEAL

A. Modified siloxane water repellent for limestone and other masonry surfaces.
1. Product: Sure Klean Weather Seal- Natural Stone Treatment
2. Manufacture: Prosoco, Inc.

2.8 Proprietary Acidic Cleaner: Manufacturer's MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride.
2. Limit cementitious materials in mortar to Portland cement and lime.
3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
4. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.

B. Mortar for Stone Masonry: Comply with ASTM C 270, property specification.

1. Mortar for Setting Stone: Type S
2. Mortar for Pointing Stone: Type N

C. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match Architect's sample.

2.9 FABRICATION

A. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.
1. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

B. Select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.

C. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.

1. Clean sawed backs of stone to remove rust stains and iron particles.

D. Shape stone for type of masonry (pattern) as follows:
1. Sawed or Split-bed, random-range ashlar with random course heights and random lengths (interrupted coursed).

E. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine substrate to verify that, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coat concrete and unit masonry backup with dampproofing.

B. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

3.3 SETTING OF STONE MASONRY, GENERAL

A. Perform necessary field cutting and trimming as stone is set.

1. Use power saws to cut stone that is fabricated with saw-cut surfaces. Cut lines straight and true, with edges eased slightly to prevent snipping.
2. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.

B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.

C. Arrange stones in range ashlar pattern with course heights as indicated, random lengths, and uniform joint widths, with offset between vertical joints as indicated.

D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.

E. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

F. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch (10 mm) at narrowest points or more 5/8 inch (16 mm) at widest points.

G. Provide sealant joints of widths and at locations indicated.

1. Keep sealant joints free of mortar and other rigid materials.
2. Sealing joints is specified in Division 07 Section "Joint Sealants."

H. Install embedded flashing and weep holes, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
1. At concrete backing, extend flashing through stone masonry, turned up a minimum of 6 inches (150 mm), and insert termination bar.
2. At sills, extend flashing not less than 6 inches (150 mm) at ends.
3. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
4. Cut flexible flashing flush with face of wall after masonry wall construction is completed.

I. Place weep holes and vents in joints where moisture may accumulate, including at base of cavity walls, above shelf angles, and at flashing.

1. Use wicking material or mesh weep holes/vents to form weep holes.
2. Use wicking material to form weep holes above flashing in stone sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes 24 inches (600 mm) o.c.

4. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.
5. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.4 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/2 inch in 40 feet (13 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/2 inch in 40 feet (13 mm in 12 m) or more.

B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (13 mm in 12 m) or more.

C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet (13 mm in 6 m) or more.

D. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.

E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.

F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

3.5 INSTALLATION OF ANCHORED STONE MASONRY

A. Anchor stone masonry to concrete tilt wall panels with screw-attached veneer anchors unless otherwise indicated.

B. Space anchors not more than 16 inches (400 mm) o.c. vertically and 16 inches (400 mm) o.c. horizontally. Install additional anchors within 12 inches (300 mm) of openings, sealant joints, and perimeter at intervals not exceeding 12 inches (300 mm).

C. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.

D. Provide 1-inch (25-mm) cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.

E. Rake out joints for pointing with mortar to depth of not less than 1/2 inch (13 mm) before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

3.6 POINTING

A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch (10 mm) deep until a uniform depth is formed.

B. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch (10 mm) deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:

1. Joint Profile: Smooth, flat face slightly below edges of stone

3.7 ADJUSTING AND CLEANING

A. Remove and replace stone masonry with the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
2. Defective joints.
3. Stone masonry not matching approved samples and mockups.
4. Stone masonry not complying with other requirements indicated.

B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.
6. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

E. Weather Seal: Preparation and Application per manufactures written instructions.

3.8 EXCESS MATERIALS AND WASTE

A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.

B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches (100 mm) in greatest dimension.
2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION 044300

SECTION 054000 - COLD FORMED METAL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Non load bearing formed steel stud for interior wall framing, site erected.
B. Formed steel slotted channel, wall framing and bridging.

1 .2 RELATED SECTIONS

A. Section 013300 - Submittal Requirements
B. Section 055000 - Metal Fabrications.
C. Section 074113 - Preformed Metal Roof Panels.
D. Section 079200 - Joint Sealers.
E. Section 092900 - Gypsum Board.

l .3 REFERENCES

A. AISI - American Iron and Steel Institute - Cold-Formed Steel Design Manual.
B. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
C. ASTM away - Still Sheet, Zinc-coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality.
D. ASTM away - Steel Sheets Zinc-coated (Galvanized) by the Hot-Dip Process.
E. ASTM A.570 - Hot-Rolled Carbon Steel Sheet and Strip. Structural Quality.
F. ASTM A61 1 - Steel, Cold-Rolled Sheet, Carbon, Structural.
G. ASTM away - Steel Sheet, Pressure Vessel Plates, Five Percent Nickel Alloy Steel, Specially Heat Treated.
H. ASTM (2955 - Load-Blaring (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.
I. AWCI (Association of Wall and Ceiling Industries) -specifications Guide for Cold Formed Steel Structural Members.
J. AWS D1.1 - Structural Welding Code.
K. AWS D1.3 - Light Steal Welding Code.
L. SSPC (Steel Structures Painting Council) - Steel Structures painting Manual.
M. NIFMA (Metal Framing Manufacturers Association) - Guidelines for the Use of Metal Framing.

1.4 SYSTEM DESCRIPTION

A. Size components to withstand design loads as follows:
    a. Vertical Assembly: positive and negative as required for the location and installation by the International Building Code 2009 Edition, and Underwriters Laboratories.
B. Maximum Allowable Deflection:
    1. At Masonry Veneer: 1/600 span.
    2. At all other flights: 1/360 span.

C. Design wall system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
D. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.5 SUBMITTALS

A. Submit under provisions of Section 013300 - Shop Drawings, Product Data, Samples, and Colors.
B. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, type and location of fasteners, and accessories or items required of related work.
C. Indicate stud layout.
D. Describe method for securing studs to tracks and for welded framing connections.
E. Product Data: Provide data on standard framing members, describe materials and finish, product criteria, limitations, and other related items.
    1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
F. Manufacturer's Installation Instructions: Indicate special procedures perimeter conditions requiring special attention, and other items requiring special attention.
G. Welding certificates.
H. Qualification data.
I. Product test reports.

1 .6 ENGINEERING

A. Certification: Submit a copy of-the manufacturer's test report or a statement by the supplier accompanied by a copy of the test results, stating that materials and fabrication comply with the provisions of this specification. Each certification so furnished shall be signed by an authorized agent of the supplier or manufacturer.
B. Design Calculations: Member sizes, gages and spacing shall be designed by the panel manufacturer and as shown on the drawings.

1 .7 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements.
B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code--Sheet Steel."
C. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."
D. Calculate structural properties of framing members in accordance with AWCI and AWS D1 .3 requirements.
E. Maintain one copy of each document on site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three (3) years documented experience.
B. Installer: Company specializing in performing the work files section with a minimum three (3) years documented experience and approved by manufacturer.
C. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Texas,

l.9 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

1.10 COORDINATION

A. Coordinate with the placement of components within the stud framing system, specified in Electrical and Mechanical Divisions and others as may be required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Dietrich Metal Framing Product Studs,
B. Unimast Incorporated Product Studs.
C. Hilti, Inc. Product Fastening Systems
D. Star Product Screws and Anchors
E. Approved Equal, Refer to Section 016000 – Product Requirements.

2.2 FRAMING MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: As required by structural performance.
C. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0239 inches (0.68 mm) 24 gauge minimum.
   2. Minimum Flange Width: 1-3/8 inches (35 mm)
   3. Sizing of all studs and framing to be confirmed by calculations for loading and stresses of the wall and framing system per manufacturer's tables and printed documentation.
D. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and same minimum base-metal thickness as steel studs.
E. Vertical Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

F. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads.
G. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
H. Drywall Furring Channel shall be hat shaped 2 9/16"' (61 mm) x 7/8" (22 mm) x 1-1/4" (32 mm) roll formed of 20 gauge (.84 mm) thick zinc coated steel.
I. Drywall carrying channel around beams and ceiling/soffits: ASTM A 645 Grade A with a minimum yield point of 40,000 psi. sheet steel formed to Cee shape, punched web; 22 Gauge (.75 mm) thick 1-1/4-inch (32 mm) face, 1 5/8-inch (41.3 mm) depth and 5/16-inch (8 mm) return zinc coated.
J. Cold rolled Channel shall be 1/2" (13 mm) x 3/4'. (19 mm), 1-1//2" (38 mm) x 17/32”, (13.5 mm), or 2"' x 17/32", (l3.5 mm) 16 gauge (1.52 mm) thick black steel.

2.3 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, .06-inch (1.5 nun) thickness.
B. Plates, Gussets, Clips: Formed sheet steel, .06 inch (1.5 mml thickness).
C. Touch-up Primer for Galvanized Surfaces: SSPC - Paint 20 Type I Inorganic zinc rich.

2.4 FASTENERS

A. Self-drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A153-B2, hot dip galvanized to 1.50 oz/sq It (380 grn/sq m).
B. Anchorage Devices: Power actuated, drilled expansion bolts and screws with sleeves,
C. Welding: In conformance with AWS D1.1 and AWS Dl .3. A11 member 18 gauge and thicker to be welded.

2.5 FABRICATION

A. Fabricate assemblies of (framed sections of sizes and profiles required' with framing members fitted, reinforced and braced to suit design requirements.
B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.6 FINISHES.

A. Studs: Galvanize to G60 coating class, to ASTM A525 and C 955l requirements; G-40 coating class on interior studs track and headers.
B. Tracks and Headers: Galvanize to G60 coating class to ASTM A525 and C955 requirements.
C. Bracing, Furring, Bridging: Same finish as framing members.
D. Plates, Gussets, Clips: Same finish as framing members.

PART 3 EXECUTION

3. 1 EXAMINATION

A. Verify that building framing components are ready to receive work.

3.2 ERECTION OF STUDDING

A. Install components in accordance with manufacturer's instructions.
B. Align floor and ceiling tracks; locate to wall layout, secure in place with fasteners or by welding at maximum spacing 24 inches (600 mm) o.c. Coordinate installation of sealant.
C. Place stud’s maximum spacing at 16 inches (406 mm) o.c.; not more than 2 inches (50 mm) from abutting walls and at each side of openings. Connect studs to tracks using welding method.
D. Construct corners using minimum three studs. Double stud wall openings, door, and windowpanes.
E. Erect stud’s one-piece full length. Splicing of studs is not permitted.
F. Erect studs, brace, and reinforce to develop full strength, to achieve design requirements.
G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
H. Install intermediate studs above and below openings to align with wall stud spacing.
I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
J. Attach cross studs to studs for stability and anchorage.
K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
L. Touch-up field welds and damaged galvanized surfaces with primer.
M. Complete framing ready to receive Insulation and Finish System.

3.3 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/8 inch (.3 mm).
B. Maximum Variation of any Member from Plane: 1/8 inch (.3 mm)

END OF SECTION 054000

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

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. Plastic-laminate cabinets.
   2. Plastic-laminate countertops.
   3. Solid-surfacing-material countertops.
   4. Closet and utility shelving.

B. Related Sections include the following:

   1. Section 061000 - Rough Carpentry: For wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.

B. Product Data: For panel products high-pressure decorative laminate adhesive for bonding plastic laminate solid-surfacing material fire-retardant-treated materials cabinet hardware and accessories and finishing materials and processes.

   1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

   2. VOC data:
      a. Adhesives:
         1) Submit manufacturer’s product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

b. Engineered Wood Products: Provide documentation that composite wood and agrifiber products are third-party certified as meeting ANSI standard requirements for formaldehyde emissions and do not contain added urea-formaldehyde resins.
   1) ANSI A208.1 – 1999, Particleboard
   2) ANSI A208.2 – 2002, Medium Density Fiberboard (MDF) for Interior Applications.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing, fixtures, faucets, soap dispensers and other items installed in architectural woodwork.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
5. Apply WI-certified compliance label to first page of Shop Drawings.

D. Samples for Initial Selection:

6. Shop-applied transparent finishes.
7. Shop-applied opaque finishes.
8. Plastic laminates.
9. Thermoset decorative panels.
10. Solid-surfacing materials.

E. Samples for Verification:

11. Lumber with or for transparent finish, not less than 50 sq. in. (300 sq. cm), 5 inches (125 mm) wide by 24 inches (600 mm) long, for each species and cut, finished on 1 side and 1 edge.
12. Veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork.
13. Veneer-faced panel products with or for transparent finish, 12 by 24 inches (300 by 600 mm), for each species and cut. Include at least one face-veneer seam and finish as specified.
14. Lumber and panel products with shop-applied opaque finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels, for each finish system and color, with 1/2 of exposed surface finished.
15. Plastic laminates, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
16. Thermoset decorative-panels, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with edge banding on 1 edge.
17. Solid-surfacing materials, 6 inches (150 mm) square.
18. Corner pieces as follows:

    a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
    b. Miter joints for standing trim.

19. Exposed cabinet hardware and accessories, one unit for each type and finish.

F. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

G. Qualification Data: For Installer and fabricator.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program

B. Installer Qualifications: Certified participant in AWI's Quality Certification Program or Licensee of WI's Certified Compliance Program.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and wood doors with face veneers that are sequence matched with woodwork and transparent-finished wood doors that are required to be of same species as woodwork.

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6. DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

1. Finger Jointed Lumber:
   a. Recycled Content: Minimum 10 percent post-consumer recycled content, or mini mum 20 percent pre-consumer recycled content at contractor’s option.
2. Sustainable Hardwood Wood Veneer Plywood: veneer panels made from certified sustainably harvested lumber veneer, over a formaldehyde-free substrate.

B. Wood Species and Cut for Transparent Finish: as indicated in the finish schedule Retain paragraph and subparagraphs below if AWI standard is used or if requirements for wood products selected exceed those in WI standard.
1. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

1. Provide edge banding as same as face laminates for exposed surfaces, and components with semiexposed edges and surface may utilize materials complying with LMA EDG-1 on door, drawers, and panels.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering high-pressure decorative laminates that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
    a. Formica Corporation.
    b. Nevamar Company, LLC; Decorative Products Div.
    c. Wilsonart International; Div. of Premark International, Inc.

E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Formica Corporation.
    b. Nevamar Company, LLC; Decorative Products Div.
    c. Wilsonart International; Div. of Premark International, Inc.

2. Type: Standard type, unless Special Purpose type is indicated.
3. Colors and Patterns **As** selected by Architect from manufacturer's full range.

F. Float Glass for Cabinet Doors: ASTM C 1036, Type I, Class (clear), Quality-Q3 6.0 mm thick.

G. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, 6 mm thick, unless otherwise indicated.

H. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

2.2 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this Article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.

1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.

3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:

1. Exterior Type: Organic-resin-based formulation thermally set in wood by kiln drying.

C. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.

1. For panels 3/4 inch (19 mm) thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi (11 MPa); modulus of elasticity, 300,000 psi (2070 MPa); internal bond, 80 psi (550 kPa); and screw-holding capacity on face and edge, 250 and 225 lbf (1100 and 1000 N), respectively.
2. For panels 13/16 to 1-1/4 inches (20 to 32 mm) thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi (9 MPa); modulus of elasticity, 250,000 psi (1720 MPa); linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf (1100 and 780 N), respectively.
3. Product: Subject to compliance with requirements, provide "Duraflake FR" by Weyerhaeuser.

D. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

1. Product: Subject to compliance with requirements, provide "Medite FR" by SierraPine Ltd.; Medite Div.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."

B. Butt Hinges: 2-3/4-inch (70-mm), 5-knuckle steel hinges made from 0.095-inch- (2.4-mm-) thick metal, and as follows:

1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602,170 degrees of opening, self-closing.

D. Back-Mounted Pulls: BHMA A156.9, B02011.

E. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, and 5/16 inch (8 mm) in diameter.

F. Catches: Magnetic catches, BHMA A156.9, B03141.

G. Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.

H. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

I. Drawer Slides: BHMA A156.9, B05091.
   1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
   2. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
   3. File Drawer Slides: Grade 1HD-200 for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
   4. Pencil Drawer Slides: Grade 1] for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.
   5. Keyboard Slides: Grade 1HD-100; for computer keyboard shelves.
   6. Trash Bin Slides: Grade 1HD-200; for trash bins not more than 20 inches (500 mm) high and 16 inches (400 mm) wide.

J. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

K. Door Locks: BHMA A156.11, E07121.

L. Drawer Locks: BHMA A156.11, E07041.

M. Grommets for Cable Passage through Countertops: 2 1/2” and 4” black, molded-plastic grommets and matching plastic caps with slot for wire passage.

   1. Product: Subject to compliance with requirements, 4 5/8” x 2 3/4” rectangular cable grommet; Haffle, 631-24-300, Black; and 2 1/2” Diameter Grommet; Haffle, 429-99-333, Black.

N. Paper Slots: 17 inches (432 mm) long by 1-3/4 inches (45 mm) wide by 1-inch (25 mm) deep; black, molded-plastic, paper-slot liner with 1/4-inch (6.4-mm) lip.

   1. Product: Subject to compliance with requirements, provide "Model CP-2" by Doug Mockett & Company, Inc.

O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
   1. Satin Chromium Plated: BHMA 652 for steel base.
   2. Satin Stainless Steel

P. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

C. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Contact Adhesive: 250 g/L.

D. Adhesive for Bonding Plastic Laminate: Unpigmented contact or Resorcinol.

2.5 FABRICATION, GENERAL

A. Interior Woodwork Grade: Unless otherwise indicated, provide Custom-grade interior woodwork complying with referenced quality standard.

1. Base, casing, trim, interior rail and wall caps and miscellaneous millwork: Select from the following, unless otherwise indicated:
   a. Hardwood derived from certified sustainable sources.
   b. Finger jointed pine or any western softwood species.
   c. Low-emission Medium Density Fiberboard.
2. Veneer panels:
   a. Substrate: Select from the following, unless otherwise indicated:
      1) Cellulose honeycomb core.
      2) Medium Density Fiberboard.
      3) Compressed straw particleboard.
3. Veneer:
   a. Veneer: Select from the following, unless otherwise indicated:
      1) Certified sustainably harvested lumber.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

D. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.5 mm).
2. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch (1.5 mm).

E. Complete fabrication, including assembly**,** finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify the Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

F. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

2.6 PLASTIC-LAMINATE CABINETS

A. Grade: Custom

B. AWI Type of Cabinet Construction: Flush overlay or as indicated on drawings.

C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

1. Horizontal Surfaces Other Than Tops: Grade HGS.
2. Postformed Surfaces: Grade HGP
3. Vertical Surfaces: Grade HGS.
4. Edges: Grade HGS matching laminate in color, pattern, and finish.

D. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies**:** High-pressure decorative laminate, Grade CLS

a. Edges of Plastic-Laminate Shelves: PVC edge banding,0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
b. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade CLS.

2. Drawer Sides and Backs: Solid-hardwood lumber
3. Drawer Bottoms: Hardwood plywood.

E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Match Architect's sample.

2.7 PLASTIC-LAMINATE COUNTERTOPS

A. Grade: Premium.

B. High-Pressure Decorative Laminate Grade: HGS or HGP as indicated on the drawings.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Match Architect's sample.

D. Edge Treatment: Same as laminate cladding on horizontal surfaces or 1 1/2” PVC Flat “T” mould edge banding; Black.

E. Core Material: Particleboard made with exterior glue.

F. Core Material at Sinks: Particleboard made with exterior glue.

G. Backer Sheet: Provide plastic-laminate backer sheet, Grade BKL, on underside of countertop substrate.

H. All outside corners to be rounded unless directed otherwise by Owner and Architect.

2.8 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Custom.

B. Solid-Surfacing-Material Thickness 3/4 inch (19 mm).

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

   1. Match Architect's sample as selected by Architect from manufacturer's full range.

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

   1. Fabricate tops with shop-applied edges of materials and configuration indicated.
   2. Fabricate tops with shop-applied backsplashes.

E. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

F. All outside corners to be rounded unless directed otherwise by Owner and Architect.

2.9 CLOSET AND UTILITY SHELVING

A. Grade: Custom.

B. Shelf Material: 3/4-inch (19-mm) veneer-faced panel product with veneer edge banding Cleats: 3/4-inch (19-mm) solid

C. Wood Species: Eastern white pine, sugar pine, or western white pine.

2.10 SHOP FINISHING

A. Grade: Provide finishes of same grades as items to be finished.

B. General: Drawings indicate items that are required to be shop finished. Finish such items at fabrication shop as specified in this Section. Refer to Division 09 painting Sections for finishing architectural woodwork not indicated to be shop finished.

C. Shop Priming: Shop apply the prime coat including backpriming, if any, for transparent-finished items specified to be field finished. Refer to Division 09 painting Sections for material and application requirements.

D. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.

1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to the back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.

E. Transparent Finish:

1. Grade: Custom.
2. AWI Finish System: Catalyzed polyurethane.
3. Staining: Match Architect's sample.
4. Sheen: Semigloss, 46-60 gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk, and filled flush with woodwork and matching final finish if transparent finish is indicated.

G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches (1500 mm) long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

1. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
2. Install wall railings on indicated metal brackets securely fastened to wall framing.
3. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches (3 mm in 2400 mm).

H. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim.

1. Install flush paneling with no more than 1/16 inch in 96-inch (1.5 mm in 2400-mm) vertical cup or bow and 1/8 inch in 96-inch (3 mm in 2400-mm) horizontal variation from a true plane.

I. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Maintain veneer sequence matching of cabinets with transparent finish.
3. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head sheet metal screws through metal backing

or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish.

J. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
3. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

K. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

L. Refer to Division 09 Sections for final finishing of installed architectural woodwork not indicated to be shop finished.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where it is not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 071900 - WATER REPELLENTS

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 penetrating water-repellent treatments for the following vertical and horizontal surfaces:
   1. Cast stone.
   2. Natural stone.

B. Related Sections:

   1. Division 03 - Concrete: For penetrating polymer sealers for exterior traffic surfaces.
   2. Section 044300 - Stone Masonry: For integral water-repellent admixture for unit masonry assemblies.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Water repellents shall meet performance requirements indicated without failure due to defective manufacture, fabrication, or installation.

B. Water Absorption: Minimum 90 percent reduction of water absorption after 24 hours in comparison of treated and untreated specimens.
   1. Cast Stone: ASTM C 1195.
   2. Natural Stone: ASTM C 97.

C. Water-Vapor Transmission: Comply with one or both of the following:

   1. Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, according to ASTM E 96/E 96M.
   2. Minimum 80 percent water-vapor transmission in comparison of treated and untreated specimens, according to ASTM D 1653.

D. Water Penetration and Leakage through Masonry: Minimum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, according to ASTM E 514.

E. Durability: Maximum **5** percent loss of water-repellent properties after 2500 hours of weathering according to ASTM G 154 in comparison to water-repellent-treated specimens before weathering.

1.4 SUBMITTALS

1. Include manufacturer's printed statement of VOC content.
2. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

B. Samples: For each type of water repellent and substrate indicated, 12 by 12 inches (300 by 300 mm) in size, with specified water-repellent treatment applied to half of each Sample.

C. Qualification Data: For qualified Applicator.

D. Product Certificates: For each type of water repellent, from manufacturer.

E. Field quality-control reports.

F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

B. Mockups: Apply water repellent to each type of substrate required.

1. Locate each test application as directed by Architect.
2. Size: 25 sq. ft. (2.3 sq. m).
3. Final approval by Architect of water-repellent application will be from test applications.

C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing and forecasted weather and substrate conditions permit water repellents to be applied according to manufacturers' written instructions and warranty requirements:

1. Concrete surfaces and mortar have cured for not less than 28 days.
2. Building has been closed in for not less than 30 days before treating wall assemblies.
3. Ambient temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C) and will remain so for 24 hours.
4. Substrate is not frozen and substrate-surface temperature is above 40 deg F (4.4 deg C) and below 100 deg F (37.8 deg C).
5. Rain or snow is not predicted within 24 hours.
6. Not less than seven days have passed since surfaces were last wet.
7. Windy conditions do not exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree(s) to repair or replace materials that fail to maintain water repellency specified in "Performance Requirements" Article within specified warranty period.

1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 100 g/L or less of VOCs.

1. Products: Subject to compliance with requirements, provide the following:
   a. PROSOCO, Inc.: Siloxane PD. VOC =25 g/l Complies with Rule 1113

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in three representative locations by method recommended by manufacturer.
2. Inspect for previously applied treatments that may inhibit penetration or performance of water repellents.
3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
4. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions and as follows:

1. Cast Stone: Remove oil, curing compounds, laitance, and other substances that inhibit penetration or performance of water repellents according to ASTM E 1857.

2. Natural Stone: ASTM C 1515.ASTM D 5107

B. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.

C. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply a heavy-saturation coating of water repellent, on surfaces indicated for treatment, using 15 psi- (103 kPa-) pressure spray with a fan-type spray nozzle to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

1. Natural Stone and Cast Stone: At Contractor's option, first application of water repellent on units may be completed before installing them. Mask mortar and sealant bond surfaces to prevent water repellent from migrating onto joint surfaces.

C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 FIELD QUALITY CONTROL

A. Testing of Water-Repellent Material: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when water repellent is being applied:

1. The owner will engage the services of a qualified testing agency to sample water-repellent material being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. The testing agency will perform tests for compliance of water-repellent material with product requirements.
3. Owner may direct Contractor to stop applying water repellents if test results show material being used does not comply with product requirements. Contractor shall remove noncomplying material from Project site, pay for testing, and correct deficiency of surfaces treated with rejected materials, as approved by Architect.

B. Coverage Test: In the presence of Architect, hose down a dry, repellent-treated surface to verify complete and uniform product application. A change in surface color will indicate incomplete application.

1. Notify Architect seven days in advance of the dates and times when surfaces will be tested.
2. Reapply water repellent until coverage test indicates complete coverage.

3.5 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071900

SECTION 072100 - THERMAL AND ACOUSTICAL INSULATION

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. Glass-fiber blanket insulation: Unfaced.
B. Related Sections:
   1. Section 092900 - Gypsum Board: For installation in metal-framed assemblies of insulation specified by referencing this Section.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.
   1. VOC data:
      a. Adhesives:
         1) Submit manufacturer’s product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
   2. Biobased materials:
      a. Indicate type of biobased material in product.
      b. Indicate the percentage of biobased content per unit of product.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

C. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES Legacy Reports

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following but are not limited to, the following:
   1. Knauf Insulation. EcoBatt Unfaced, Glass-Fiber Blanket Insulation:
      a. ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

   2. Schedule:
      a. Exterior Walls: R-19 min
      b. Roof Deck where insulated between joists: R-38 min.
      c. Interior Partitions: 3.5 inches R-13

B. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
   1. Free of Formaldehyde: Insulation manufactured with one hundred percent (100%) acrylic binders and no formaldehyde.
   2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

2.2 SEMI RIGID INSULATION AT SPANDREL GLAZING

A. Spandrel Glass-Un-faced semi-rigid R-13- Size 24x48

2.3 RIGID INSUALTION AT EXTERIOR WALLS

A. Extruded Polystyrene: Size 4’x8’x1”, R-5

2.4 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
   1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following]:
      a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
      b. Gemco; Spindle Type.
   2. Plate: Perforated, galvanized carbon-steel sheet, 0.030-inch (0.762 mm) thick by two (2) inches (50 mm) square.
   3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.

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. Gemco; 90-Degree Insulation Hangers.

C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
   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. AGM Industries, Inc.; RC150.
      b. Gemco; R-150.
   2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
      a. Ceiling plenums.

D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
   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. AGM Industries, Inc.; TACTOO Adhesive.
      b. Gemco; Tuff Bond Hanger Adhesive.

E. Impaling Pins @ Spandrel Glass fasteners: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates. Pattern as recommended by manufacturer.

1. Complies with ASTM C612, Type 1A/1B.

2. Facing permeance determined through ASTM E96

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   1. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   2. Maintain three (3)-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   3. For metal-framed wall cavities where cavity heights exceed ninety-six (96) inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

3.4 INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION

A. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation forty-eight (48) inches (1219 mm) up either side of partitions above finished ceilings.

3.5 INSULATION SCHEDULE

A. Insulation Type A: Unfaced, glass-fiber blanket insulation 6.0-Inch-Thick R-19 for all exterior walls unless otherwise indicated from floor to deck or to floor above. Friction fit between studs and mechanically attach as required.

B. Insulation Type B Unfaced glass fiber blanket sound batts 3.5 inch for all interior partitions and above ceiling locations as shown on drawings.

C. Insulation Type C: Unfaced, glass-fiber blanket insulation in two (2) layers of 6.0-Inch-T Thick R-19 for all attic ceilings unless otherwise indicated. Friction fit between joists and studs mechanically attach as required.

END OF SECTION 072100

SECTION 072413 - POLYMER-BASED EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Exterior insulation and finish system (EIFS) applied over concrete.
   2. Prefabricated panels and trim pieces consisting of EIFS applied over concrete.

B. Related Sections:
   1. Section 079200 - Joint Sealants: For sealing joints in EIFS with elastomeric joint sealants.
   2. Section 099113 - Exterior Paint: For finish painting of all completed EIFS surfaces.

1.3 SYSTEM DESCRIPTION

A. Class PB EIFS: A Drainable, non-load-bearing, exterior wall cladding system that consists of an insulation board attached adhesively, mechanically, or both to the substrate; an integrally reinforced base coat; and a textured protective finish coat.
B. All exposed EIFS surfaces to be painted per Section 099113 - Exterior Painting.

1.4 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with the following:

   1. Bond Integrity: Free from bond failure within EIFS components or between system and supporting wall construction, resulting from exposure to fire, wind loads, weather, or other in-service conditions.
   2. Weather tightness: Resistant to water penetration from exterior into EIFS and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of EIFS and assemblies behind it, including substrates, supporting wall construction, and interior finish.

B. Class PB EIFS: Provide EIFS having physical properties and structural performance that comply with the following:

   1. Abrasion Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 1/2-inch- (12.7-mm-) thick gypsum board; cured for a minimum of 28 days; and showing no cracking, checking, or loss of film integrity after exposure to 528 quarts (500 L) of sand when tested per ASTM D 968, Method A.
   2. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01.

3. Accelerated Weathering: Five samples per ICC-ES AC219 showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, delamination, or other characteristics that might affect performance as a wall cladding after testing for 2000 hours when viewed under 5 times magnification per ASTM G 153 or ASTM G 155
4. Freeze-Thaw: No surface changes, cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination, or indications of delamination between components when viewed under 5 times magnification after 60 cycles per EIMA 101.01.
5. Mildew Resistance of Finish Coat: Sample applied to 2-by-2-inch (50.8-by-50.8-mm) clean glass substrate, cured for 28 days, and showing no growth when tested per ASTM D 3273 and evaluated according to ASTM D 3274.
6. Salt-Spray Resistance: No deleterious affects when tested according to ICC-ES AC219.
7. Tensile Adhesion: No failure in the EIFS, adhesive, base coat, or finish coat when tested per EIMA 101.03.
8. Water Penetration: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 1/2-inch- (12.7-mm-) thick gypsum board, cured for 28 days, and showing no water penetration into the plane of the base coat to expanded-polystyrene board interface of the test specimen after 15 minutes at 6.24 lbf/sq. ft. (299 Pa) of air pressure difference or 20 percent of positive design wind pressure, whichever is greater, across the specimen during a test period when tested per EIMA 101.02.
9. Water Resistance: Three samples, each consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 1/2-inch- (12.7-mm-) thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, rusting, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.
10. Impact Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS when constructed, conditioned, and tested per EIMA 101.86; and meeting or exceeding the following:
    a. Standard Impact Resistance: 25 to 49 inch-lb (2.8 to 5.6 J).
11. Structural Performance Testing: EIFS assembly and components shall comply with ICC-ES AC219 when tested per ASTM E 330.

C. Performance of Prefabricated Panels: Prefabricated panels shall be designed as follows and withstand the structural performance indicated for Class PB EIFS and thermal movement limits indicated below without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Delegated Design: Design prefabricated panels, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Structural Performance: EIFS shall withstand the effects of gravity loads and the loads and stresses within limits and under conditions indicated according to SEI/ASCE 7
3. Deflection Limits: Design prefabricated panels to withstand design loads without deflections greater than 1/240.
4. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
    a. Temperature Change (Range): 100 deg F (55 deg C

1.5 SUBMITTALS

A. Product Data: For each type and component of EIFS indicated.
B. Shop Drawings: For EIFS. Include plans, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, lifting points for prefabricated panels, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work.
C. Panel Schedule: For prefabricated panel fabrication.
D. Samples for Initial Selection: For each type of finish-coat color and texture indicated.
    1. Include similar Samples of joint sealants and exposed accessories involving color selection.
E. Samples for Verification: 24-inch- (600-mm-) square panels for each type of finish-coat color and texture indicated, prepared using same tools and techniques intended for actual work including custom trim, each profile, aesthetic reveal, coping caps, fascia, a typical control joint filled with sealant of color selected.
    1. Include sealants and exposed accessory Samples to verify color selected.
F. Design Submittal: For prefabricated panels indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
G. Qualification Data: For Installer**,** fabricator/erector, professional engineer**,** and testing agency.
H. Manufacturer Certificates: Signed by manufacturers certifying that EIFS and joint sealants comply with requirements.
I. Material or Product Certificates: For cementitious materials and aggregates and for each insulation and joint sealant, from manufacturer.
J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each**,** insulation, reinforcing mesh, joint sealant, and coating.
K. Compatibility and Adhesion Test Reports: For joint sealants from sealant manufacturer indicating the following:
    1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
    2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
L. Field quality-control reports and special inspection reports as required by the local authority having jurisdiction.
M. Evaluation Reports: For adhesive membrane flashing and EIFS (including insulation), Maintenance Data: For EIFS to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is certified in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.
    1. Certified in writing by EIFS manufacturer as qualified to fabricate and erect manufacturer's prefabricated panel system using skilled and trained workers.
B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with system components.

C. Fire-Test-Response Characteristics: Provide EIFS and system components with the following fire-test-response characteristics as determined by testing identical EIFS and system components per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
   1. Surface-Burning Characteristics: Provide insulation board, adhesives, base coats, and finish coats with flame-spread index of 25 or less and smoke-developed index of 450 or less, per ASTM E 84.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution and set quality standards for fabrication and installation.
   1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Pre-installation Conference: Conduct conference at project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials inside and under cover; keep them dry and protected from weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, construction traffic, and other causes.
   1. Stack insulation board flat and off the ground.
   2. Protect plastic insulation against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
   3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Maintain ambient temperatures above 40 deg F (4.4 deg C) for a minimum of 24 hours before, during, and after adhesives or coatings are applied. Do not apply EIFS adhesives or coatings during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions required for prefabricated panels by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate installation of EIFS with related Work specified in other Sections to ensure that wall assemblies, joint sealants, and windows, are protected against damage from the effects of weather, age, corrosion, moisture, and other causes. Do not allow water to penetrate behind flashing or barrier coating of EIFS.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Dryvit Systems, Inc.
   2. Parex, Inc.; a brand of Parex Lahabra, Inc.
   3. Senergy; Degussa Wall Systems, Inc.
   4. Sto Corp.
   5. TEIFS, Inc.

2.2 MATERIALS

A. Compatibility: Provide adhesive, fasteners, board insulation, reinforcing meshes, base- and finish-coat systems, sealants, and accessories that are compatible with one another and with substrates and approved for use by EIFS manufacturer for Project.
   1. Fasteners: Where required, wafer-head or flat-head steel drill screws complying with ASTM C 954, with an organic-polymer coating or other corrosion-protective coating having a salt-spray resistance of more than 500 hours per ASTM B 117.

B. Primer/Sealer: EIFS manufacturer's standard substrate conditioner with VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.

C. Flexible-Membrane Flashing: Cold-applied, fully self-adhering, self-healing, rubberized-asphalt and polyethylene-film composite sheet or tape and primer; EIFS manufacturer's standard or product recommended in writing by EIFS manufacturer.

D. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; compatible with substrate; with VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and complying with the following:
   1. Factory-mixed non-cementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.

E. Molded, Rigid Cellular Polystyrene Board Insulation: Comply with ASTM C 578, Type II or Type IV per EIFS manufacturer's requirements; and EIMA's "EIMA Guideline Specification for Expanded Polystyrene (EPS) Insulation Board" for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:
   1. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks or by another method approved by EIMA that produces equivalent results.
   2. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, per ASTM E 84.
   3. Dimensions: Provide insulation boards not more than 24 by 48 inches (610 by 1219 mm) and in thickness indicated, but not more than 4 inches (102 mm) thick or less than thickness allowed by ASTM C 1397.
   4. Foam Shapes: Provide with profiles and dimensions indicated on Drawings.

F. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multi-end strands with retained mesh tensile strength of not less than 120 lbf/in. (21 dN/cm) per ASTM E 2098; complying with ASTM D 578 and the following:
   1. Standard-Impact Reinforcing Mesh: Not less than 4.0 oz./sq. yd. (136 g/sq. m).
   2. Strip Reinforcing Mesh: Not less than 3.75 oz./sq. yd. (127 g/sq. m).
   3. Detail Reinforcing Mesh: Not less than 4.0 oz./sq. yd. (136 g/sq. m).
   4. Corner Reinforcing Mesh: Not less than 7.2 oz./sq. yd. (244 g/sq. m).

G. Base-Coat Materials: EIFS manufacturer's standard mixture complying with the following:
   1. Factory-mixed non-cementitious formulation of polymer-emulsion adhesive and inert fillers that is ready to use without adding other materials.

H. Primer: EIFS manufacturer's standard factory-mixed, elastomeric-polymer primer for preparing base-coat surface for application of finish coat.

I. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based coating complying with the following:
   1. Factory-mixed formulation of polymer-emulsion binder, colorfast mineral pigments, sound stone particles, and fillers.
      a. Aggregate: Chips of size and color as selected by Architect from manufacturer's full range.
   2. Colors: As selected by Architect**.**

J. Water: Potable.

K. Mechanical Fasteners: Where required, EIFS manufacturer's standard corrosion-resistant fasteners consisting of thermal cap, standard washer and shaft attachments, and fastener indicated below; selected for properties of pullout, tensile, and shear strength required to resist design loads of application indicated; capable of pulling fastener head below surface of insulation board; and of the following description:

L. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard Cell Class for use intended, and ASTM C 1063.
   1. Casing Bead: Prefabricated, one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
   2. Drip Screed/Track: Prefabricated, one-piece type for attachment behind insulation with face leg extended to form a drip, of depth required to suit thickness of coating and insulation, with face leg perforated for bonding to coating and back leg.
   3. Expansion Joint: Prefabricated, one-piece V profile; designed to relieve stress of movement.
   4. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.
   5. Parapet Cap Flashing: Type for both flashing and covering parapet top with design complying with ASTM C 1397.

2.3 ELASTOMERIC SEALANTS

A. Elastomeric Sealant Products: Provide EIFS manufacturer's listed and recommended chemically curing, elastomeric sealant that is compatible with joint fillers, joint substrates, and other related materials, and complies with requirements for products and testing indicated in ASTM C 1481 and with requirements in Division 07 Section "Joint Sealants" for products corresponding to description indicated below:
   1. Single-component, non-sag, neutral-curing silicone sealant.

B. Sealant Color: Custom color as selected by Architect.

2.4 MIXING

A. General: Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers. Use materials within time period specified by EIFS manufacturer or discard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of EIFS.
B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Begin coating application only after surfaces are dry.
   2. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.
B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind EIFS and deterioration of substrates.
C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.
   1. Concrete Substrates: Provide clean, dry, neutral-pH substrate for insulation installation. Verify suitability of substrate by performing bond and moisture tests recommended by EIFS manufacturer.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397 and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Waterproof Adhesive/Base Coat: Apply over parapets to protect substrates from degradation.

3.5 TRIM INSTALLATION

A. Trim: Where indicated apply trim accessories at perimeter of EIFS, at expansion joints, at windowsills, parapet caps, and elsewhere as indicated, according to EIFS manufacturer's written instructions. Coordinate with installation of insulation.

1. Drip Screed/Track: Use at bottom edges of EIFS unless otherwise indicated.
2. Windowsill Flashing: Use at windows unless otherwise indicated.
3. Expansion Joint: Use where indicated on Drawings.
4. Casing Bead: Use at other locations.
5. Parapet Cap Flashing: Use where indicated on Drawings.

3.6 INSULATION INSTALLATION

A. Board Insulation: Adhesively attach insulation to substrate in compliance with ASTM C 1397, EIFS manufacturer's written instructions, and the following:

1. Apply adhesive to insulation by notched-trowel method in a manner that results in coating the entire surface of sheathing with adhesive once insulation is adhered to sheathing unless EIFS manufacturer's written instructions specify using primer/sealer with ribbon-and-dab method. Apply adhesive to a thickness of not less than 1/4 inch (6.4 mm) for factory mixed and not less than 3/8 inch (9.6 mm) for field mixed, measured from surface of insulation before placement.
2. Press and slide insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface.
3. Allow adhered insulation to remain undisturbed for period recommended by EIFS manufacturer, but not less than 24 hours, before beginning rasping and sanding insulation, or applying base coat and reinforcing mesh.
4. Apply insulation over dry substrates in courses with long edges of boards oriented horizontally.
    a. Adhesive Attachment: Offset joints of insulation not less than 6 inches (150 mm) from horizontal and 4 inches (100 mm) from vertical joints in sheathing.
5. Interlock ends at internal and external corners.
6. Abut insulation tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between boards. If gaps greater than 1/16 inch (1.6 mm) occur, fill with insulation cut to fit gaps exactly; insert insulation without using adhesive or other material.
7. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes complying with details indicated.
8. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch (0.8 mm)] [1/16 inch (1.6 mm) from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch (1.6 mm).

9. Cut aesthetic reveals in outside face of insulation with high-speed router and bit configured to produce grooves, rabbets, and other features that comply with profiles and locations indicated. Do not reduce insulation thickness at aesthetic reveals to less than 3/4 inch (19 mm).
10. Install foam shapes and attach to structure.
11. Interrupt insulation for expansion joints where indicated.
12. Form joints for sealant application by leaving gaps between adjoining insulation edges and between insulation edges and dissimilar adjoining surfaces. Make gaps wide enough to produce joint widths indicated after encapsulating joint substrates with base coat and reinforcing mesh.
13. After installing insulation and before applying reinforcing mesh, fully wrap board edges with strip reinforcing mesh. Cover edges of board and extend encapsulating mesh not less than 2-1/2 inches (64 mm) over front and back face unless otherwise indicated on Drawings.
14. Treat exposed edges of insulation as follows:
    a. Except for edges forming substrates of sealant joints, encapsulate with base coat, reinforcing mesh, and finish coat.
    b. Encapsulate edges forming substrates of sealant joints within EIFS or between EIFS and other work with base coat and reinforcing mesh.

B. Expansion Joints: Install at locations indicated, and where required by EIFS manufacturer, and as follows:
1. At expansion joints in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
3. Where wall height or building shape changes.
4. Where EIFS manufacturer requires joints in long continuous elevations.
5. Where panels abut one another.

3.7 BASE-COAT INSTALLATION

A. Base Coat: Apply to exposed surfaces of insulation and foam shapes in minimum thickness recommended in writing by EIFS manufacturer, but not less than [1/16-inch (1.6-mm) dry-coat thickness.

B. Reinforcing Mesh: Embed type indicated below in wet base coat to produce wrinkle-free installation with mesh continuous at corners and overlapped not less than 2-1/2 inches (64 mm) or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Do not lap reinforcing mesh within 8 inches (204 mm) of corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are not visible.
1. Standard impact reinforcing mesh unless otherwise indicated.

C. Double-Layer Reinforcing Mesh Application: Where indicated, apply second base coat and second layer of standard-impact reinforcing mesh, overlapped not less than 2-1/2 inches (64 mm) or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions in same manner as first application. Do not apply until first base coat has cured.
1. At aesthetic reveals, apply strip reinforcing mesh not less than 8 inches (200 mm) wide.
2. Embed strip reinforcing mesh in base coat before applying first layer of reinforcing mesh.

D. Foam Shapes: Fully embed reinforcing mesh in base coat.

E. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness as first application except without reinforcing mesh. Do not apply until first base coat has cured.

3.8 FINISH-COAT INSTALLATION

A. Primer: Where required, apply over dry base coat according to EIFS manufacturer's written instructions.

B. Finish Coat: Apply over dry base coat, maintaining a wet edge at all times for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.
   1. Texture: As selected by Architect from manufacturer's full range.

C. Sealer Coat: Apply coating over dry finish coat, in number of coats and thickness indicated in Section 099663 - Elastomeric Coatings.

3.9 INSTALLATION OF JOINT SEALANTS

A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements in Section 079200 - Joint Sealants, and in ASTM C 1481.
   1. Apply joint sealants after base coat has cured but before applying finish coat.
   2. Clean surfaces to receive sealants to comply with indicated requirements and EIFS manufacturer's written instructions.
   3. Apply primer recommended in writing by sealant manufacturer for surfaces to be sealed.
   4. Install sealant backing to control depth and configuration of sealant joint and to prevent sealant from adhering to back of joint.
   5. Apply masking tape to protect areas adjacent to sealant joints. Remove tape immediately after tooling joints, without disturbing joint seal.
   6. Recess sealant sufficiently from surface of EIFS so an additional sealant application, including cylindrical sealant backing, can be installed without protruding beyond EIFS surface.

3.10 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
   1. According to ICC-ES AC219.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: For the following:
   1. According to ICC-ES AC219.

D. Remove and replace EIFS where test results indicate that EIFS do not comply with specified requirements.

E. Prepare test and inspection reports.

3.11 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072413

SECTION 072720 – FLUID-APPLIED AIR BARRIER ASSEMBLY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Materials and installation methods supplementing a one-component vapor permeable, liquid applied elastic air and water barrier.

B. Materials and installation to bridge and seal the following air leakage pathways and gaps:

1. Connections of the walls to the roof air barrier.

2. Connections of the walls to the foundations.

3. Expansion joints.

4. Openings and penetrations of window frames, store front, curtain wall.

5. Barrier precast concrete and other envelope assembly.

6. Door frames.

7. Piping, conduit, duct, and similar penetrations.

8. Masonry ties, screws, bolts, and similar penetrations.

9. All other air leakage pathways in the building envelope.

10. Sealing flashing to wall surface.

1.2 RELATED SECTIONS

A. Section 044300 – Stone Masonry.

B. Section 054000 – Cold-Formed Metal Framing.

C. Section 061000 – Rough Carpentry.

D. Section 079000 – Joint Sealants.

E. Section 092900 – Gypsum Board.

1.3 PERFORMANCE REFERENCES

A. ASTM E 2178-01: Standard Test for Determining the Air Permeability of Building Materials.

B. ASTM E 2357, Standard Test Method for Determining Air Leakage of Air Barrier Assembly (Full Scale Wall Testing of the Air Barrier System).

C. ASTM E283-91: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

D. CODE MANDATED ASTM E331: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

E. ASTM E96: Water Vapor Transmission of Materials, Procedure B

F. AATCC 127 Water Resistance

G. ASTM D 1970, Self Sealability

H. ICC-ES AC212, Freeze Thaw, Crack Bridging

I. CODE MANDATED Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.

J. ASTM E84, Standard Test Method for Surface Burning

K. Listed as an evaluated system by Air Barrier Association of America at www.airbarrier.org

1.4 PERFORMANCE REQUIREMENTS

A. Provide an air barrier system constructed to perform as a continuous elastic air barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

1. The air barrier shall have the following characteristics:

a. It must be continuous, with all joints made airtight.
b. It shall be capable of withstanding positive and negative combined design wind, fan, and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure. It shall not displace adjacent materials under full load. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent assembly, allowing for the relative movement of assembly due to thermal and moisture variations and creep. Connection shall be made between:

1) Foundation and walls.

2) Walls and windows or doors.
3) Different wall assembly.
4) Wall and roof.
5) Wall and roof over unconditioned space.
6) Walls, floor and roof across construction, control, and expansion joints.
7) Walls, floors and roof to utility, pipe, and duct penetrations.
8) Flashing to wall surface.

2. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

3. Air Permeability: Maximum 0.04 cfm/sq.ft. @ 10.5 psf per ASTM E283.

4. Air Permeability: @ delta P of 0.3 inches water...0.002 CFM/ft² per ASTM E 2178

5. ASTM E 2357, Full Scale Wall Testing of the Air Barrier System

   a. System Air Leakage, Requirement – 0.0008 CFM/ft² maximum

   b. Penetration Check, Requirement – 0.00088 CFM/ft² maximum

6. ASTM E96 Water Vapor Permeance:10-20 Perms per Procedure B

7. ASTM E331, Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference - 10 psf for 2 hours.

8. Elongation: Minimum 50% per ASTM D412.

9. AATC 127 Water Resistance – Pass

10. ASTM D 1970 Self Sealability – Pass

11. ICC-ES AC212, Freeze Thaw, Crack Bridging – Pass

12. Fire Testing: Air Barrier, as a component of a wall assembly, shall have passed a NFPA 285 complete wall fire test.

13. ASTM E84 Class A Fire Resistant

14. Listed as an evaluated assembly by the Air Barrier Association of America at www.airbarrier.org

1.5 SUBMITTALS

A. Section 013300 – Submittal Procedures: Submittal Procedures.

B. Prior to commencing the Work, submit manufacturer's independent Laboratory Report for the Air Barrier Assembly testing on ASTM E 2357 tested on a steel stud frame wall, results are to be based on Specimen 2 testing only.

C. Prior to commencing the Work, submit documentation certifying that the air barrier system has been tested independently, indicating compliance with the performance requirements of the Air Barrier Association of Association.

D. Prior to commencing the Work, submit copies of manufacturers' literature for the system, membrane, primers, sealants, adhesives and associated auxiliary materials shall be included as parts of the system that is listed by the Air Barrier Association of America evaluation.

E. Prior to commencing the Work, submit references clearly indicating that the materials proposed have been installed for not less than three years on projects of similar scope and nature.

F. Prior to commencing the Work, submit manufacturers' complete set of standard details for air barrier/vapor retarders. The manufacturer's representative shall review the contract drawings and note any modifications required to make the system air and watertight.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Provide primary products, including each component of the air barrier membrane system, which has been commercially available for a minimum of 3 years.

B. Submit in writing, a document stating that the applicator of the primary air barrier membrane specified in this section is recognized by the manufacturer as suitable for the execution of the Work.

C. Perform Work in accordance with the printed requirements of the air barrier manufacturer and this specification.

D. Maintain one copy of manufacturer instructions on site.

E. At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the air barrier membrane manufacturer's representative.

F. Components used in this section shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, tapes and adhesives as listed as an evaluated air barrier assembly by the Air Barrier Association of America.

1.7 MOCK-UP

A. Construct mock-up in accordance with Section 014000 – Quality Requirements: Requirements for a mock-up.

B. Provide mock-up of air barrier materials under provisions of Section 044300 – Stone Masonry.

C. Items to be incorporated in mock-up include:

1. Where directed by Architect, construct typical exterior wall panel, 6’-0” long by 6’-0” high, incorporating masonry veneer system, through wall flexible flashing, exterior gypsum sheathing, wall ties, board insulation, metal studs, aluminum curtain wall frame, aluminium window frame, showing air barrier membrane application details and transition membranes.

D. Allow 72 hours for inspection of mock-up by Architect before proceeding with air barrier work.

1.8 PRE-INSTALLATION CONFERENCE

A. Convene four weeks prior to commencing work of this section, under provisions of Section 01 30 00 – Administrative Requirements: Pre-Installation Meeting. Attendance by the manufacturer’s representative along with the installer is mandatory.

DO NOT PROCEED WITH THE INSTALLATION OF THE AIR BARRIER MEMBRANE AND THE THROUGH WALL FLASHING MEMBRANE PRIOR TO THE PRE-INSTALLATION CONFERENCE.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

B. All pail goods shall bear the ABAA Evaluated Air Barrier label

C. Store roll materials on end in original packaging.

D. Keep all products stored at above 40˚F. Apply to a substrate with a surface T˚F of 40˚F and rising. DO NOT ALLOW PRODUCT TO FREEZE.

E. Protect rolls from direct sunlight until ready for use.

F. Do not double stack pail goods.

1.10 COORDINATION

A. Ensure continuity of the air seal throughout the scope of this section.
B. Drainage plane to include water resistive barrier and flexible flashings to exterior

PART 2 - PRODUCTS

2.1 MEMBRANES

A. Liquid air barrier: One component elastomeric membrane, spray, trowel, or brush applied, having the following characteristics, and have passed all evaluations by the Air Barrier Association of America (ABAA) and be listed on their web site as having passed all the evaluations:

1 Air Barrier Material permeability test:
a. Air Leakage per ASTM E 2178, dry film, delta P of 0.3 inches of water, 0.002 +/- 10%

2 Air Barrier System Test on Full Scale Wall Assembly, ASTM E 2357
a. System Air Leakage, 0.0008 CFM/ft² +/- 10%
b. Penetrations Check, MUST PASS ASTM E 2357 requirements

3. Water Vapor permeance: (704 ng/Pa.m^2.s.) 10 to 20 perms, ASTM E96 Method B. NOTE: THE MATERIAL SPECIFIED IS VAPOR PERMEABLE.

4. Elongation (ASTM D412: >50%)

5. Low temperature flexibility and crack bridging: Pass – ICC-ES AC212

6. ASTM D 1970, Self Sealability – Pass

7. AATCC 127 Water Resistance – Pass

8. ASTM E84, Class A Fire Resistant

9. Recycle content >20%

B. Acceptable Manufacturers
1. Sika, Sikagard 535
2. DuPont Liquid Applied Tyvek

C. Transition Membrane, Self-Adhering: Polymer-based, sheet membrane with/without polyester facing, and having the following physical properties:

1 Thickness: 20 to 40 mils (0.5 mm) min.

2. Vapor permeance: <0.1

3. Low temperature flexibility: -20 F to CGSB 37-GP-56M.

4. Elongation: >50% to ASTM D412-modifed

5. Acceptable material:
   1) Sika Membran 540 for use with the Sikagard 530 system
   2) As recommended by Dupont

D. Contractor Qualifications:

1. Contractor shall provide a manufacture's letter stating that they have been trained and are approved to apply the manufacturers' air barrier.

2.2 PRIMER

A. Primer for self-adhering membranes: Synthetic polymer-based adhesive type, quick setting, having the following characteristics:

a. Acceptable material: As manufactured and/or recommended by the Air Barrier System manufacturer. Note: Primer shall be compatible with specified exterior gypsum sheathing.
b. Verify compatibility of self-adhering membranes with preservative treated materials specified in Section 06 10 53. Prime preservative treated materials as required using primer recommended by self-adhering membrane manufacturer.

2.3 SEALANTS

A. Sealants shall be compatible with air barrier assembly and shall be approved by the air barrier manufacturer.

B. Products:

1. Sikaflex 11FC

C. Primers: As recommended by manufacturer for surfaces to be sealed.

D. Backer Rods: As recommended by sealant manufacturer.

E. Others as recommended by manufacturer

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.

3.2 PREPARATION

A. All surfaces must be sound, dry, clean, and free of oil, grease, dirt, excess mortar, or other contaminants. Fill spalled areas in substrates to provide an even plane.

B. Mortar joints in concrete block and form tie holes/voids in poured concrete shall be filled flush and smooth and allowed to be cured for a minimum of 24 hours.

C. All joints between gypsum sheathing, roof board, masonry and concrete and other substrate joints up to 1/4" wide shall be treated:
   1. Sikaflex 11FC

D. All joints between gypsum sheathing, masonry and concrete and other substrates wider than 1/4" shall be sealed with:

   1. Sika Membran 540

E. Install backer rod and sealant at the following joints:

   1. All expansion/control/erection joints between concrete wall panels.

   2. All expansion/control joints in concrete block back-up.

   3. All joints between concrete wall panels and concrete block back-up.

3.3 PRIMER FOR TRANSITION MEMBRANE (SELF-ADHERING TYPE ONLY)

A. Apply primer for self-adhering membranes at rate recommended by manufacturer.

B. Apply primer to all areas to receive transition sheet membrane as indicated in Drawings by roller or spray and allow minimum 30-minute open time. Primed surfaces not covered by transition membrane during the same working day must be re-primed.

3.4 TRANSITION MEMBRANE (SELF-ADHERING TYPE)

A. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2-inch overlap at all end and side laps unless otherwise noted.

B. Tie-in to roofing system and at the interface of dissimilar materials as indicated in Drawings.

C. Promptly roll all laps and membrane with a countertop roller to affect seal.

D. Ensure all preparatory work is complete prior to applying liquid membrane.

3.5 PRIMARY AIR BARRIER

A. Apply by spray or roller, a complete and continuous unbroken film at an ambient and substrate surface temperature of 40˚F and rising with less than a 30% chance of rain in the next 18 hours and apply at the same rate as listed in the Air Barrier Association of America evaluation

1. Exterior Gypsum Sheathing, Plywood or OSB

a. Sikagard 530 at a minimum of 2.5 gallons per 100ft² (40 ft²/gallon)
b. Spray around all projections, including masonry veneer anchors, ensuring a complete and continuous air seal.

3.6 INSPECTION

A. Notify Architect when sections of work are complete so as to allow for review prior to installing insulation. The manufacturer's representative shall be on site to review the installation along with the Architect.
B. Make notification when sections of work are complete to allow review prior to covering water-resistive vapor permeable air barrier system.
C. Owner to engage independent consultant to observe substrate and membrane installation prior to placement of cladding systems and provide written documentation of observations.

3.7 PROTECTION OF FINISHED WORK

A. Liquid membranes are not designed for permanent exposure. Cover the liquid membrane, as recommended by the manufacturer, within the following time frames. Contractor shall verify the number of calendar days with the air barrier manufacturer:

1. Cover the Sikagard 530 material within 180 calendar days after installation. The nature of this product is such that some surface weathering may become apparent during exposure. This is a surface effect only and does not impact air barrier system performance.

2. Transition membranes shall be covered within 180 days after installation

B. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through the air barrier and at protrusions according to air barrier manufacturer's written instructions.

3.8 SCHEDULE

A. Install liquid membrane system over the entire surface of the exterior sheathing in the following area. Seal any masonry anchor penetrations airtight.

1. In the masonry cavity wall.

B. Install liquid membrane system over the entire surface of the outer surface of the inner wythe of masonry. Seal any masonry anchor penetrations airtight.

C. Install liquid membrane system over the entire surface of the outer surface of the concrete wall panels. Seal any masonry anchor penetrations airtight.

D. Install liquid membrane system over the entire surface of the exterior gypsum sheathing and/or roof board in the following area:

1. Behind the metal parapet panels.
2. Behind the metal wall and soffit panels.

E. Hollow Metal Door Frames: Seal door frame to wall surface with transition membrane.

F. Wall and Roof Junction: Seal wall to roof with transition membrane.

G. Seal joints in exterior sheathing with tape in the following areas:

1. Cement plaster soffit.

H. Seal the top of sheathing to the underside of the roof assembly with foam or LT-100.

I. Openings: Seal around the perimeter of all openings with transition membrane.

J. Perimeter wood nailers at wall openings: Cover all exposed surfaces of wood nailers with transition membrane. Extend membrane over sheathing, masonry and metal framing as shown.

K. Aluminum window frames with nailing flanges: Seal the nailing flanges to the wall surface with transition membrane.

L Aluminum window frames without nailing flanges: Seal frames to the wall surface with transition membrane.

M. Aluminum storefront frames: Seal frames to the wall surface with transition membrane.

N. Aluminum curtain wall frames: Seal frames to wall surface with transition membrane.

END OF SECTION 072720

SECTION 074113 – PREFORMED METAL ROOF PANELS

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. Standing-seam metal roof panels.
   2. Pre-Finished Soffit Panels

B. Related Sections:
   1. Section 013300 - Submittal Requirements
   2. Section 076200 - Sheet Metal Flashing and Trim: For field-formed flashings, and other sheet metal work not part of metal roof panel assemblies.
   3. Section 079200 - Joint Sealants: For field-applied sealants not otherwise specified in this Section.

1.3 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight roofing system.

1.4 REFERENCES

A. American Iron & Steel Institute (AISI) Specification for the Design of Cold Formed Steel Structural Members.

B. ASTM A-525 Steel Sheet, Zinc-Coated (Galvanized)

C. ASTM E-1680 Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems

D. ASTM E-1646 Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference

E. ASTM E-1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

F.	Spec Data Sheet -	Aluminum Zinc Alloy Coated Steel (Galvalume) Sheet Metal by Bethlehem Corp.
G.	SMACNA -	Architectural Sheet Metal Manual.
H.	U.L.	Building Materials Directory - Underwriter's Laboratories, Test Procedure UL - 580.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Design metal roof panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Air Infiltration: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of roof area when tested according to ASTM E 1680 at the following test-pressure difference:
   1. Test-Pressure Difference: Negative 34.1 psf.
   2. Test-Pressure Difference: Positive and negative 10.9 psf.
   3. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
   4. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

D. Water Penetration: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
   1. Test-Pressure Difference: 20 percent of positive design wind pressure, but not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12.0 lbf/sq. ft. (575 Pa).
   2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
   3. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

E. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

F. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592:
   1. Snow Loads: 25 lbf/sq. ft. (1197 Pa).
   2. Deflection Limits: Metal roof panel assemblies shall withstand wind and snow loads with vertical deflections no greater than 1/240 of the span.

G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F (67 deg C), ambient**;** material surfaces.

H. Thermal Performance: Provide insulated metal roof panel assemblies with thermal-resistance value (R-value) indicated when tested according to ASTM C 518.

I. Energy Performance: Provide roof panels that are listed on the U.S. Department of Energy's ENERGY STAR Roof Products Qualified Product List for steep-slope roof products.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
   1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
      a. Flashing and trim.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
   1. Metal Roof Panels: 12 inches (300 mm) long by actual panel width. Include fasteners, clips, closures, and other metal roof panel accessories.
   2. Trim and Closures: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
   3. Accessories: 12-inch (300-mm-) long Samples for each type of accessory.

D. Delegated-Design Submittal: For metal roof panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installers of the items involved:
   1. Roof panels and attachments.
   2. Purlins and rafters.
   3. Roof-mounted

F. Manufacturer Certificates: Signed by manufacturer certifying that roof panels comply with energy performance requirements specified in "Performance Requirements" Article.

G. Qualification Data: For qualified Installer professional engineer and testing agency.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

I. Field quality-control reports.

J. Maintenance Data: For metal roof panels to be included in maintenance manuals.

K. Warranties: Samples of special warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations: Obtain each type of metal roof panels from single source from a single manufacturer.

D. Surface-Burning Characteristics: Provide metal roof panels having insulation core material with the following surface-burning characteristics as determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 75 or less.

E. Fire-Resistance Ratings: Where indicated, provide metal roof panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
   2. Combustion Characteristics: ASTM E 136.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical roof eave**,** including fascia**,** as shown on Drawings; approximately four panels wide by full eave width, including subdecking, underlayment, attachments, and accessories.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Pre-installation Conference: Conduct conference at project site.
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal roof panel Installer, metal roof panel manufacturer's representative, metal deck purlin and rafter Installer, and installers whose work interfaces with or affects metal roof panels including installers of roof accessories and roof-mounted equipment.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal roof panel installation, including manufacturer's written instructions.
   4. Examine deck substrate purlin and rafter conditions for compliance with requirements, including flatness and attachment to structural members.
   5. Review structural loading limitations of deck purlins and rafters during and after roofing.
   6. Review flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
   7. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
   8. Review temporary protection requirements for metal roof panel assembly during and after installation.
   9. Review roof observation and repair procedures after metal roof panel installation.
   10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal roof panels, and other manufactured items so as not to be damaged or deformed. Package metal roof panels for protection during transportation and handling.

B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal roof panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

E. Protect foam-plastic insulation as follows:
   1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
   2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to the Project site before installation time.
   3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.10 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal roof panels with rain drainage work, flashing, trim, and construction of decks, purlins and rafters, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal roof panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. Warranty Period: Twenty (20) years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
   1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   1. Recycled Content: Provide steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.
   2. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
   3. Surface: Smooth, flat finish.
   4. Exposed Coil-Coated Finish: Berridge Zinc-Cote, Champagne, Honey Walnut and Matte Black
      a. 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   5. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.35 mil (0.013 mm).

B. Panel Sealants:
   1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
   2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
   3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: 40 mils (1.0 mm) thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
   1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
   2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
   3. Products: Subject to compliance with requirements, provide one of the following:
      a. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.
      b. Grace Construction Products; a unit of Grace, W. R. & Co.; Ultra.
      c. Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.3 ROOF SUBSTRATE

A. Decking: Steel metal roof deck

B. JOISTS: Steel beams and joist, center varies from 5’-0” to 7’-1 maximum.

2.4 MISCELLANEOUS METAL FRAMING

A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated. Refer to Section 054000 Cold Formed Metal Framing.

B. Hat-Shaped, Rigid Furring Channels:
   1. Nominal Thickness As required to meet performance requirements.

C. Cold-Rolled Furring Channels:
   1. As required to meet performance requirements.

D. Fasteners for Miscellaneous Metal Framing:
   1. As required to meet performance requirements.

E. MISCELLANEOUS MATERIALS

F. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching the color of metal roof panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.5 STANDING-SEAM METAL ROOF PANELS

A. General: Provide Berridge factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips inside laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
   1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

B. Vertical-Rib, Seamed-Joint, Standing-Seam Metal Roof Panels formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and mechanically seaming panels together.
   1. Manufacturers: Subject to compliance with requirements, provide products the following:
      a. Match existing metal roof panels in profile, panel width, and color
         1. Berridge: Cee Lock
         2. Substitutions under provisions of Section 016000
   2. Material: Zinc-coated (galvanized) 24-gauge core steel sheet,0.022-inch (0.56-mm) nominal thickness.
      a. Exterior Finish: 2-coat fluoropolymer
      b. Color: Berridge Lead-Cote.

C. Clips:
   1. Evaluation ID: RC-140
      Fixed
      a. Material: 0.064-inch- (1.63-mm-) nominal thickness, zinc-coated (galvanized**)** steel sheet.
   2. Joint Type: Snap-Lock Seam.
   3. Panel Coverage: 16 ½ inches (419 mm).
   4. Panel Height: 2 ½ inches (38 mm).

2.6 METAL SOFFIT PANEL

A. Pre-finish metal soffit panel with concealed fasteners. 12 3/4” panel with intermediate grooves.
   1. Manufacturer
      a. Berridge: Vee-Panel
      b. Substitutions under provisions of Section 016000

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Material: Zinc-coated (galvanized) 18-gauge core steel sheet, Nominal thickness.
   a. Exterior Finish: 2-coat fluoropolymer.
   b. Color: Berridge Honey Walnut
   c. Size and Profile: 12 3/4” (324 mm) x1 3/8“(10mm).
   d. Pre-finish edge trim.

2.7 CORTEN WALL PANELS

A. General: Cor-Ten, ASTM A606-4, High Strength weathering steel, 18 GA. coil formed into 14“ h. x 1” d. interlocking horizonal wall panels as detailed in drawings, outside corner angle trim, Cap Trim, offset cleat and sill and soffit trim. A606-4 should not be used with dissimilar metals other than stainless steel. Concealed fasteners to be stainless steel screws. When exposed paint head brown

2.8 METAL WALL PANEL

A. Pre-finish metal soffit panel with concealed fasteners. ¾” deep x 36” 22 Gage panel with intermediate ribs at 6” on center
   1. Manufacturer
      a. Berridge: M-Panel
      b. Substitutions under provisions of Section 016000

   .

   Material: Zinc-coated (galvanized) 22-gauge core steel sheet, Nominal thickness.
   a. Exterior Finish: 2-coat fluoropolymer.
   b. Color: Champagne
   c. Size and Profile: 36” (914 mm) x 3/4“(19mm).
   d. Pre-finish edge trim to match panel .

2.9 ACCESSORIES

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
   2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
   3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

   4. Facia and Trim: Matte Black, Refer to drawings

2.`10F FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that

provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather tight and minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. End Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
   3. End Seams for Other Than Aluminum: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   4. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
   5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   6. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA's "Architectural Sheet Metal Manual" or by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

2.11 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

C. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking, and that installation is within flatness tolerances required by metal roof panel manufacturer.

D. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

E. For the record, prepare a written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

G. The Appointed Qualified Inspector “AQI” is to observe and inspect the installation of Roofing system, all components, and accessories to confirm compliance with the approved materials and design. Do not cover prior to inspection.

H. Per the requirements of RC-209

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

B. Substrate Board: Install substrate boards over roof deck on entire roof surface. Attach with substrate-board fasteners.
1. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
2. Comply with UL requirements for fire-rated construction.

C. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
1. Entire roof area to be covered with preformed metal roof panels

B. Install flashings to cover underlayment to comply with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.4 METAL ROOF PANEL INSTALLATION, GENERAL

A. Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.
   1. Point of Fixity: Fasten each panel along a single line of fixing located at ridge.
   2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Install metal roof panels as follows:
   1. Commence metal roof panel installation and install a minimum of 300 sq. ft. (27.8 sq. m.) in the presence of factory-authorized representative.
   2. Field cutting of metal panels by torch is not permitted.
   3. Install panels perpendicular to purlins.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Provide metal closures at rake walls.
   6. Flash and seal metal roof panels with weather closures at eaves, rakes, and perimeter of all openings.
   7. Install caps and closures as metal roof panel work proceeds.
   8. End Splices: Locate panel end splices over, but not attached to, structural supports. Stagger panel end splices to avoid a four-panel splice condition.
   9. Install metal flashing to allow moisture to run over and off metal roof panels.

D. Fasteners:
   1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized-steel fasteners for surfaces exposed to the interior.

E. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

F. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

   1. Coat the back side of roof panels with bituminous coating where roof panels will contact wood, ferrous metal, or cementitious construction.

G Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

   1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.
   2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
   1. Install clips to supports with self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

3.6 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1-inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1500 mm) o.c. in between.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074113

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

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. Fully adhered TPO membrane roofing system.
2. Cover board – adhesively bonded to roof insulation.
3. Roof insulation – mechanically fastened to roof deck.

B. Related Sections:

1. Division 06 - Wood, Plastics and Composites.
2. Section 072100 - Thermal and Acoustical Insulation: For insulation above the roof deck.
3. Section 076200 - Sheet Metal Flashing and Trim: For metal roof penetration flashings, flashings, and counter flashings.
4. Division 07: Expansion Control: For proprietary manufactured roof expansion-joint assemblies.
5. Section 079200 - Joint Sealants: For joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

A. TPO: Thermoplastic polyolefin.

B. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1. Corner Uplift Pressure: 36.8 lbf/sq. ft. (1.76 kPa/sq. m).
2. Perimeter Uplift Pressure: 24.4 lbf/sq. ft. (1.17 kPa/sq. m).
3. Field-of-Roof Uplift Pressure: 14.6 lbf/sq. ft. (0.70 kPa/sq. m).

D. Energy Performance: Provide roofing system that is listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Product Data: For roof materials, indicating that roof materials comply with Solar Reflectance Index requirement. Weathered SRI shall be .83 or greater.
2. Product Data: For adhesives and sealants, including printed statement of VOC content.
3. Emissivity data: Provide information identifying the emissivity of the following products provided under work of this Section:
    a. Roofing.
        1. Provide minimum 0.9 emissivity as tested in accordance with ASTM E408.
4. Energy Efficiency:
    a. Submit documentation for Energy Star qualifications for products provided under the work of this Section.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:

1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
2. Roof insulation.
3. Metal termination bars.
4. Six insulation fasteners of each type, length, and finish.

D. Qualification Data: For qualified Installer and manufacturer.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of compliance with performance requirements.

2. Submit Project Initiation Number (PIN)

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

G. Research/Evaluation Reports: For components of membrane roofing system, from the ICC ES Legacy Report.

H. Field quality-control reports.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM Approvals approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Source Limitations: Obtain components including roof insulation fasteners, adhesive**s** for membrane roofing system from same manufacturer as membrane roofing.

D. Exterior Fire-Test Exposure: ASTM E 108, Class A, for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of the applicable testing agency.

F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at project site. Convene meeting two (2) weeks prior to roof deck installation.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

G. Preinstallation Roofing Conference: Conduct conference at project site one week prior to starting roof installation.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.
10. Commissioning requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing 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. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. 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.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, roofing accessories, special sheet metal flashing and trim, and other components of membrane roofing system.
2. Warranty Period: Fifteen (15) 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 the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

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

PART 2 - PRODUCTS

2.1 TPO MEMBRANE ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible TPO sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, but not limited to the following:
   a. Elevate. UltraPly TPO XR 115 (Basis of Design)
   b. Carlisle.
   c. Substitutions under provision of Section 016000.
2. Roofing System:
   a. Membrane: Externally Reinforced (Fleece Backed) Thermoplastic Polyolefin (TPO).
   b. Thickness: 60 mils (1.52 mm).
   c. Membrane Attachment: Adhered.
   d. Slope: Deck is sloped slope of 1/4 inch per foot (1:48); provide additional slope of 1/2 inch per foot (1:24) by means of tapered insulation.
   e. Comply with applicable local building code requirements.
   f. Provide assembly having Underwriters Laboratories, Inc. (UL) Class A, Fire Hazard Classification.

g. Provide assembly complying with Factory Mutual Corporation (FM) Roof Assembly Classification, FM DS 1-28 and 1-29, and meeting minimum requirements of FM 1-,90 wind uplift rating.
h. Exposed Face Color: White.
i. Solar Reflectance Index, Initial/3 yr.
   1) CRRC - SRI 98/83
   2) Energy Star-SRI-0.79/0.68
   3) LEED - 98/83

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

   a. Plastic Foam Adhesives: 50 g/L.
   b. Gypsum Board and Panel Adhesives: 50 g/L.
   c. Multipurpose Construction Adhesives: 70 g/L.
   d. Fiberglass Adhesives: 80 g/L.
   e. Contact Adhesive: 80 g/L.
   f. Other Adhesives: 250 g/L.
   g. Single-Ply Roof Membrane Sealants: 450 g/L.
   h. Nonmembrane Roof Sealants: 300 g/L.
   i. Sealant Primers for Nonporous Substrates: 250 g/L.
   j. Sealant Primers for Porous Substrates: 775 g/L.

B. Sheet Flashing: Manufacturer's standard unreinforced thermoplastic polyolefin sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as sheet membrane.

C. Bonding Adhesive: Manufacturer's standard Firestone UltraPly TPO XR Adhesive.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

E. Metal Battens (where required): Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), pre-punched.

F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

G. Miscellaneous Accessories: Provide pourable sealers, preformed cone, and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.3 VAPOR RETARDER

A. Where required by roof membrane manufacture provide vapor retard as noted in this paragraph.

B. Polyethylene Film: ASTM D 4397, 6 mils (0.15 mm) thick, minimum, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
2. Adhesive: Manufacturer's standard lap adhesive, FM Approvals approved for vapor-retarder application.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured by TPO membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class I, Grade 3 (25 psi), felt or glass-fiber mat facer on both major surfaces as acceptable to roof membrane manufacturer. Insulation shall be R-25 (4.5 inches) minimum unless noted otherwise on the drawings.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per twelve (12) inches (1:48) unless otherwise indicated on the drawings.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.5 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

C. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch (6.0 mm) factory primed.

1. Products: Subject to compliance with requirements, provide the following:

a. Georgia-Pacific Corporation; Dens Deck Prime .

2.6 ACCESSORIES

A. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder. – Mechanical Mezzanine

1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.

2. Height: 42 inches (1060 mm) above finished roof deck.

3. Material: Steel tube.

4. Post: 1-5/8-inch- (41-mm-) diameter pipe.

5. Finish: Manufacturer's standard baked enamel or powder coat.

a. Color: Safety Yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of wood roof deck complies with manufacture's requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 VAPOR-RETARDER INSTALLATION

A. Polyethylene Film (If required), loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of two (2) inches (50 mm) and six (6) inches (150 mm), respectively.

1. Continuously seal side and end laps with tape

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components, so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 3.1 inches (78 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of twelve (12) inches (300 mm) in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of twelve (12) inches (300 mm) in each direction. Loosely butt cover boards together and fasten to roof insulation with adhesive as recommended by roofing manufacturer.

1. Adhere cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.
2. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.9 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: _____
2. Address: _____
3. Building Name: _____
4. Address: _____
5. Area of Work: _____
6. Acceptance Date: _____.
7. Warranty Period: _____ .
8. Expiration Date: _____.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. Lightning;
    b. Peak gust wind speed exceeding 90 mph;
    c. Fire;
    d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. Vapor condensation on bottom of roofing; and
    g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. The owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20_____.

1. Authorized Signature: _____.
2. Name: _____
3. Title: ._____

END OF SECTION 075423

SECTION 076200 - 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. Manufactured Products:

a. Manufactured through-wall flashing and counterflashing.

2. Formed Products:
a. Formed low-slope roof sheet metal fabrications.

B. Related Sections:

1. Section 061000 - Rough Carpentry: For wood nailers, curbs, and blocking.
2. Section 074113 - Preformed Metal Roof Panels for metal roof and soffit panels
3. Section 075423 - Thermoplastic Polyolefin (TPO) Roofing: For installing sheet metal flashing and trim integral with membrane roofing.
4. Division 07: Roof Accessories: For set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated 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. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) , material surfaces.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:

1. Identification of material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.
9. Detail formed flashing and trim at a scale of not less than 1-1/2 inches per 12 inches 1:10).

C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
3. Accessories and Miscellaneous Materials: Full-size Sample.
4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

E. Qualification Data: For qualified fabricator.

F. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

G. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at project site.

   1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
   2. Review methods and procedures related to sheet metal flashing and trim.
   3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
   4. Review special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect sheet metal flashing.
   5. Document proceedings, including corrective measures and actions required, and furnish a copy of the record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Warranty Period: Ten (10) years from date of substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Copings and Trim – Exposed:

C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed.

1. Finish: 2B (bright, cold rolled
2. Surface: Smooth, flat.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
3. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Coatings & Waterproofing Inc.; CCW WIP 300HT.
b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
c. Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal 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 loads and recommended by manufacturer of primary sheet metal.

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.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder:

1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethan**e** polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Through-Wall Ribbed Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry with ribs at 3-inch (75-mm) intervals along length of flashing to provide an integral mortar bond. Manufacture through-wall flashing with snaplock receiver on exterior face to receive counterflashing

1. Stainless Steel: 0.016 inch (0.40 mm) thick.

a. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:

1) Cheney Flashing Company; Cheney Flashing (Dovetail).
2) Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
3) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.

B. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions with interlocking counterflashing on exterior face, of same metal as reglet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Cheney Flashing Company.
b. Fry Reglet Corporation.
c. Heckmann Building Products Inc.
d. Hickman, W. P. Company.

2. Material: Stainless steel, 0.019 inch (0.48 mm) thick
3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
5. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
6. Accessories:

    a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
    b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

I. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

2.6 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high, end dams where flashing is discontinuous. Fabricate from the following materials:
1. Stainless Steel: 0.016 inch (0.40 mm) thick.

B. Wall Expansion-Joint Cover: Fabricate from the following materials:
1. Stainless Steel: 0.019 inch (0.48 mm) thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:
1. Stainless Steel: 0.019 inch (0.48 mm) thick.

B. Overhead-Piping Safety Pans: Fabricate from the following materials:
1. Stainless Steel: 0.025 inch (0.64 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
2. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
3. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

G. Splash Pans: Install where downspouts discharge on low-slope roofs <Insert surface>. Set in elastomeric sealant compatible with roofing membrane.

H. Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
2. Loosely lock front edge of scupper with conductor head.
3. Solder or seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with sealant. Secure in a waterproof manner by means of snap-in

installation and sealant or lead wedges and sealant or interlocking folded seam or blind rivets and sealant anchor and washer at 36-inch (900-mm) centers.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Reglets: Installation of reglets is specified in Division 03 - Concrete

C. Opening Flashings in Frame Construction: Install continuous head and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Overhead-Piping Safety Pans: Suspend pans independent from structure above as indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

B. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.8 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

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. Silicone joint sealants.
2. Urethane joint sealants.
3. Polysulfide joint sealants.
4. Latex joint sealants.
5. Solvent-release-curing joint sealants.
6. Preformed joint sealants.
7. Acoustical joint sealants.

B. Related Sections:

1. Section 013300 - Submittal Requirements
2. Division 03 - Concrete.
3. Division 07: Expansion Control: For building expansion joints.
4. Division 07: Fire-Resistive Joint Systems: For sealing joints in fire-resistance-rated construction.
5. Section 084413 - Glazed Aluminum Curtain Walls: For structural and other glazing sealants.
6. Section 088000 - Glazing: For glazing sealants.
7. Section 092900 - Gypsum Board: For sealing perimeter joints.
8. Section 093000 - Tiling: For sealing tile joints.
9. Section 095123 - Acoustical Tile Ceilings: For sealing edge moldings at perimeters with acoustical sealant.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Qualification Data: For qualified Installer.

F. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

G. VOC data:

1. Architectural Sealants:
   a) Submit manufacturer’s product data for sealants. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

H. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

J. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

K. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

L. Field-Adhesion Test Reports: For each sealant application tested.

M. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from a single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.
   1. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. Mockups: Install sealants in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

E. Preinstallation Conference: Conduct conference at project site.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

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

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

   1. Warranty Period: Ten (10) years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24).

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.
4. Nonmembrane Roof Sealants: 300 g/L.
5. Single-Ply Roof Membrane Sealants: 450 g/L.
6. Other Sealants: 420 g/L.
7. Modified Bituminous Sealant Primers: 500 g/L.
8. Other Sealant Primers: 750 g/L.
9. Toxicity/IEQ:
    a. Comply with applicable regulations regarding toxic and hazardous materials, and as specified.
    b. Sealants containing aromatic solvents, fibrous talc, formaldehyde, halogenated solvents, mercury, lead, cadmium, chromium, and their compounds, are not permitted.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range of standard and custom colors to match a maximum of five colors as selected by Architect.

2.2 SILICONE JOINT SEALANTS

A. SEALANT NO. 01: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 790. VOC 30 g/L
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Pecora Corporation; 890FTS.
d. Sika Corporation, Construction Products Division; SikaSil-C990.
e. Tremco Incorporated; Spectrem

B. SEALANT NO. 02: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following

a. BASF Building Systems; Omniseal 50.
b. Dow Corning Corporation; 795. VOC 32 g/L
c. GE Advanced Materials-Silicones; UltraPruf II SCS2900.
d. Pecora Corporation; 895.
e. Sika Corporation, Construction Products Division; SikaSil-C995.
f. Tremco Incorporated; Spectrem 2

C. SEALANT NO. 03: Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 799.VOC: <65 g/L
b. GE Advanced Materials-Silicones; UltraGlaze SSG4000AC.
c. Tremco Incorporated; Tremsil 600.

D. SEALANT NO. 04: Single-Component, Nonsag, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Bostik, Inc.; Chem-Calk 1200.
b. Dow Corning Corporation; 999-A. VOC 36 g/L
c. GE Advanced Materials - Silicones; Construction SCS1200.
d. Pecora Corporation; 860.

e. Tremco Incorporated; Tremsil 200.

E. SEALANT NO. 05: Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; NS Parking Structure Sealant. VOC <45 g/L
b. Pecora Corporation; 301 NS
c. Tremco Incorporated; Spectrem 800.

F. SEALANT NO. 06: Single-Component, Pourable, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade P, Class 100/50, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; SL Parking Structure Sealant. VOC: <35 g/L
b. Pecora Corporation; 300 SL.
c. Tremco Incorporated; Spectrem 900 SL.

G. SEALANT NO. 07: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following, but are not limited to, the following]:

a. BASF Building Systems; Omniplus.
b. Dow Corning Corporation; 786 Mildew Resistant. VOC: <90 g/L
c. GE Advanced Materials - Silicones; Sanitary SCS1700.
d. Tremco Incorporated; Tremsil 200 Sanitary.

2.3 URETHANE JOINT SEALANTS

A. SEALANT NO. 08: Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following, but are not limited to, the following]:

a. Sika Corporation, Construction Products Division; Sikaflex - 15LM. VOC: 50 g/L
b. Tremco Incorporated; Vulkem 921.

B. SEALANT NO. 09: Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic NP1
b. Pecora Corporation; Dynatrol I-XL.
c. Sika Corporation, Construction Products Division; Sikaflex-1a. VOC: 50 g/L

d. Tremco Incorporated; Vulkem 116.

C. SEALANT NO. 10: Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic SL 1. VOC: 104 g/L
b. Pecora Corporation; Urexpan NR-201.
c. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
d. Tremco Incorporated; Vulkem 45.

D. SEALANT NO. 11: Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Pecora Corporation; Dynatrol II.
b. Polymeric Systems, Inc.; PSI-270.
c. Tremco Incorporated; Dymeric 240 . VOC 30 g/L

E. SEALANT NO. 12: Multicomponent, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic NP 2. VOC: <80 g/L
b. Pecora Corporation; Dynatred.
c. Sika Corporation, Construction Products Division; Sikaflex - 2c NS
d. Tremco Incorporated; Vulkem 227.

F. SEALANT NO. 13: Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic NP 2. VOC: <80 g/L
b. Pecora Corporation; Dynatred.
c. Sika Corporation, Construction Products Division; Sikaflex - 2c NS
d. Tremco Incorporated; Vulkem 227.

G. SEALANT NO. 14: Immersible, Single-Component, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Uses T and I.

1. Products: Subject to compliance with requirements, provide one of the following

a. BASF Building Systems; Sonolastic NP1. VOC: 43 g/L
b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
c. Tremco Incorporated; Vulkem 116.

H. SEALANT NO. 15: Immersible, Single-Component, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Uses T and I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Sika Corporation, Construction Products Division; Sikaflex - 1CSL.
b. Tremco Incorporated; Vulkem 45. VOC: 85 g/L

I. SEALANT NO. 16: Immersible Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Uses T and I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic NP 2. VOC: <80 g/L
b. Pecora Corporation; Dynatred.
c. Tremco Incorporated; Vulkem 227.

J. SEALANT NO. 17: Immersible Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: ASTM C 920. Type M, Grade P, Class 25, for Use T and I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. LymTal International, Inc.; Iso-Flex 880 GB.
b. May National Associates, Inc.; Bondaflex PUR 2 SL. VOC 61 g/L
c. Tremco Incorporated; Vulkem 245.

2.4 POLYSULFIDE JOINT SEALANTS

A. SEALANT NO. 18: Single-Component, Nonsag, Polysulfide Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide the following available products that may be incorporated into the Work include, but are not limited to, the following]:
a. W. R. Meadows, Inc.; Deck-O-Seal One Step. VOC: 12 g/L

B. SEALANT NO. 19: Multicomponent, Nonsag, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic Polysulfide Sealant. VOC: 100 g/L
b. Pecora Corporation; Synthacalk GC-2+.
c. W. R. Meadows, Inc.; Deck-O-Seal Gun Grade. VOC: 0 g/L

C. SEALANT NO. 20: Multicomponent, Nonsag, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolastic Polysulfide Sealant. VOC: 100 g/L

b. Pecora Corporation; Synthacalk GC-2+.

D. SEALANT NO. 21: Multicomponent, Pourable, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following]:

a. Pacific Polymers International, Inc.; Elastoseal 227 Type I.
b. W. R. Meadows, Inc.; Deck-O-Seal 125. VOC: 5 g/L

E. SEALANT NO. 22: Immersible, Multicomponent Nonsag, Traffic-Grade, Polysulfide Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T and Use I.

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

a. Pecora Corporation; Synthacalk GC-2+. VOC: 20 g/L

2.5 LATEX JOINT SEALANTS

A. SEALANT NO. 23: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following] available products that may be incorporated into the Work include, but are not limited to, the following]:

a. BASF Building Systems; Sonolac. 41 g/L
b. Pecora Corporation; AC-20+. VOC: 31 g/L
c. Tremco Incorporated; Tremflex 834.

2.6 PREFORMED JOINT SEALANTS

A. SEALANT NO. 26: Preformed Silicone Joint Sealants: Manufacturer's standard sealant consisting of precured low-modulus silicone extrusion, in sizes to fit joint widths indicated, combined with a neutral-curing silicone sealant for bonding extrusions to substrates.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 123 Silicone Seal. VOC: 0 g/L
b. GE Advanced Materials - Silicones; UltraSpan US1100.
c. Pecora Corporation; Sil-Span.

B. SEALANT NO. 27: Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. (160 kg/cu. m) and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dayton Superior Specialty Chemicals; Polytite Standard.
b. EMSEAL Joint Systems, Ltd.; Emseal 25V.
c. Sandell Manufacturing Co., Inc.; Polyseal. VOC: 0 g/L
d. Willseal USA, LLC; Willseal 150

2.7 ACOUSTICAL JOINT SEALANTS

A. SEALANT NO. 28: Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide one of the following] available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; AC-20 FTR. 31 g/L
b. USG Corporation; SHEETROCK Acoustical Sealant. VOC: <15 g/L

2.8 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance for one of the following:

1. Type C (closed-cell material with a surface skin)

2. Type O (open-cell material)

3. Type B (bicellular material with a surface skin)

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean, porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturers' written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

    1. Place sealants so they directly contact and fully wet joint substrates.
    2. Completely fill recesses in each joint configuration.
    3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs 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.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed, and cured sealant joints as follows:
    a. Perform 1 test for each 1000 feet (300 m) at six (6) inches of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

    a. Whether sealants filled joint cavities and are free of voids.
    b. Whether sealant dimensions and configurations comply with specified requirements.
    c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

    a. Control and expansion joints in stone paving units or brick pavers.
    b. Isolation and contraction joints in cast-in-place concrete slabs.
    c. Joints between plant-precast architectural concrete units.
    d. Joints in flatwork, sidewalks, and curbing.
    e. Tile control and expansion joints.
    f. Joints between different materials listed above.
    g. Other joints as indicated.
2. Joint Sealant: SEALANT No. 10 Sonolastic SL-1.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Construction joints in cast-in-place concrete.
    b. Joints between plant-precast architectural concrete units.
    c. Control and expansion joints in unit masonry.
    d. Joints in dimension stone cladding.
    e. Joints in glass unit masonry assemblies.
    f. Joints in exterior insulation and finish systems.
    g. Joints between metal panels.
    h. Joints between different materials listed above.
    i. Perimeter joints between materials listed above and frames of doors windows and louvers.
    j. Control and expansion joints in overhead surfaces.
    k. Other joints as indicated.
2. Joint Sealant: SEALANT No. 2 Dow 795.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

    a. Isolation joints in cast-in-place concrete slabs.
    b. Control and expansion joints in stone flooring.
    c. Control and expansion joints in brick flooring.
    d. Control and expansion joints in tile flooring.
    e. Other joints as indicated.
2. Joint Sealant: SEALANT No. 12 Sonolastic NP-2.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints of exterior openings where indicated.
    c. Tile control and expansion joints.
    d. Vertical joints on exposed surfaces of interior unit masonry concrete walls and partitions.
    e. Joints on underside of plant-precast structural concrete beams.
    f. Perimeter joints between interior wall surfaces and frames of interior doors windows and elevator entrances.
    g. Other joints as indicated.

2. Joint Sealant: SEALANT No. 23 Sonolac.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated.

2. Joint Sealant: SEALANT No. 07 Dow Corning 786.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Location:

a. Acoustical joints where indicated.
b. Other joints as indicated.

2. Joint Sealant: SEALANT No. 28 USG SHEETROCK.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION 079200

SECTION 081210 - INTERIOR ALUMINUM DOORS AND WINDOW FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Related Documents:
   1. Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.
B. Section Includes:
   1. Aluminum door frames for interior use.
   2. Aluminum door frames with sidelight frame components for interior use.
   3. Aluminum doors.
C. Related Sections:
   1. Section 081416 - Flush Wood Doors.
   2. Section 087100 - Finish Hardware.
   3. Section 088000 - Glazing.

1.2 SUBMITTALS

A. Submit under provisions of Section 013300.
B. Product Data: Submit for door and sidelight frames.
   1. Include information for factory finish, glazing gaskets, accessories, and other required components.
   2. Include color charts for finish indicating manufacturer's standard colors available for selection.
C. Shop Drawings: Submit schedule indicating opening identification number, frame types, dimensions, swing, label, and hardware requirements. Use same reference numbers for openings as Contract Drawings.
D. Include elevations and details indicating frame types, profiles, conditions at openings, methods, and locations of anchoring, glazing requirements, hardware locations, and reinforcements for hardware, details of connections to special construction and other custom features.
E. Samples: Submit following:
   1. Samples indicating quality of finish in selected colors on alloys used for Work.
F. Informational Submittals: Submit manufacturer's instructions.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Provide aluminum frames, aluminum and glass doors, and accessories produced by a single manufacturer for each type of product indicated.
B. Manufacturer’s Qualifications: Manufacturer shall demonstrate previous experience in the manufacturing of interior aluminum door framing for a period of not less than 10 years on comparable sized project.
C. Fire and Smoke Rated Assemblies:
   1. Where fire-rated openings are scheduled or required by authorities having jurisdiction, provide fire-rated aluminum frames that have been tested and certified to meet the requirements of UBC 7.2 Positive Pressure Test for specified exposure by an agency acceptable to governing authorities.

2. Provide labels permanently fastened on each fire rated frame and door that are within size limits established by NFPA and the testing authority.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver frames and doors in cartons to provide protection during transit and storage at project site.
B. Inspect frames and doors upon delivery for damage.
   1. Repair minor damage to pre-finished products by means as recommended by manufacturer
   2. Replace frames and doors that cannot be satisfactorily repaired.
C. Store frames and doors at project site under cover and as near as possible to final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not begin installation of frames or doors until the area of work has been completely enclosed and the interior is protected from the elements.
B. Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy. If necessary, provide temperature control and ventilation to maintain required environmental conditions.

1.6 WARRANTY

A. Warrant against defects in manufacturing of materials for a period of 2 years from date of substantial completion.
B. Warrant framing finish against defects, including cracking, flaking, blistering, peeling, and excessive fading, chalking and non-uniformity in color for a period of 5 years.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS

A. Manufacturers:
   1. Meet of exceed standards of manufacture, appearance, performance, function, and design, of Raco Interior Products, Inc.
   2. Substitutions: Comply with provisions of Section 016000.

B. Acceptable Products:
   1. Interior Door Frames: RACO Classic Prestige fixed throat frames to accommodate wall thicknesses indicated on Drawings.
   2. Interior Borrowed Light Framing: Raco Classic Free Standing, fixed throat frames to accommodate wall thicknesses indicated on Drawings; height as indicated on plans.

2.2 MATERIALS

A. Aluminum: Meeting requirements of ASTM B221, 6063T5 alloy, and as otherwise required to assure compliance with dimensional tolerances and maintain color uniformity. Billets shall be composed of at least 33% recycled aluminum.

B. Anchorage Devices, Clips and Fasteners: Manufacturer's standard type, compatible with materials being secured.
C. Accessories: As necessary for complete system.

2.3 EXTRUDED ALUMINUM FRAME AND DOOR FABRICATION

A. Assemble all sidelights and windows with the use of clips.
B. Do not exceed maximum size of window or door to meet applicable code requirements.
C. Factory pre-machine door frame jambs and doors, and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required, and fastened within frame with concealed screws.

2.4 DOOR COMPONENTS

A. Door stiles and rails shall be tubular sections accurately joined at corners with heavy concealed reinforcement brackets.
   1. Door Side Rails to be 5-inch x 1 3/4 inch.
   2. Door Top Rail to be 5 ½ inch x 1 3/4 inch.
   3. Door Bottom Rail to be ADA compliant.
B. Doors shall have snap-in stops with E.P.D.M. glazing gasket on both side of glass, no screws permitted.

2.5 FINISHES

A. Factory finish extruded frame and door components so that all parts exposed to view upon completion of installation are uniform in finish and color. Exposed surfaces shall be free of scratches and other serious blemishes.
B. Clear Anodized: AA-M12C22A21, etched, medium matte, #14 clear anodic coating.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine project conditions and verify that project is ready for work of this section to proceed. Do not proceed with installation until unsatisfactory conditions have been corrected.
B. Verify wall thickness does not exceed manufacturer=s recommended tolerances of specified throat size.

3.2 INSTALLATION

A. Comply with frame and door manufacturer's printed installation instructions and approved shop drawings. Do not attempt installation in areas where wall thickness exceeds tolerances of specified throat size.
B. Install frames plumb and square, free from warp or twist, securely anchored to substrates with fasteners recommended by frame manufacturer. Maintain dimensional tolerances and alignment with adjacent work. Ensure joints are hairline-tight and surfaces flush with adjacent components.

C. Set all doors in correct locations as shown on the drawings, level, square, plumb and in alignment with other work in accordance with the manufacturer's installation instructions and approved shop drawings.
D. Install glass in accordance with Section 088000.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 1/16 inches per 10 ft (1.5 mm/3 m), whichever is less.
B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/64 inch (0.4 mm).

3.4 ADJUSTING AND CLEANING

A. Protect exposed portions of aluminum surfaces from damage by plaster, lime, acid, cement, and other contaminants.
B. Touch up marred areas so that touch-up is not visible from a distance of 4 feet. Remove and replace frames that cannot be satisfactorily adjusted.

3.5 PROTECTION

A. Protect as required to assure that frames and doors will be without damage until Substantial Completion.

3.6 SCHEDULES

A. Door Frames: Prestige Classic Design with full height studs.

END OF SECTION 081210

SECTION 081416 - FLUSH WOOD DOORS

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. Solid-core doors plastic-laminate faces, fire rated and non-fire rated.
2. Factory fitting flush wood and factory machining for hardware.

B. Related Sections:

1. Section 013300 - Submittal Requirements
2. Section 064023 - Interior Architectural Woodwork.

1.3 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction. include factory-finishing specifications, including documentation indicating that product contains no urea formaldehyde.

1. VOC data:

a. Adhesives for factory fabrication:
1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.
b. Engineered Wood Products: Provide documentation that composite wood and agrifiber products are third-party certified as meeting ANSI standard requirements for formaldehyde emissions contain no added urea-formaldehyde resins.]
1) ANSI A208.1 – 1999, Particleboard
2) ANSI A208.2 – 2002, Medium Density Fiberboard (MDF) for Interior Applications

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire-protection ratings for fire-rated doors.

C. Samples for Initial Selection: For plastic-laminate door faces
D. Samples for Verification:

1. Plastic laminate, 6 inches (150 mm) square, for each color, texture, and pattern selected.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.
    a. Provide samples for each species of veneer and solid lumber required.
    b. Provide samples for each color, texture, and pattern of plastic laminate required.
    c. Finish veneer-faced door samples with same materials proposed for factory-finished doors.

E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Source Limitations: Obtain flush wood doors from single manufacturer.

C. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated".

1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

D. Forest Certification: Provide doors made with cores obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 and UBC Standard 7-2.

1. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

F. Preinstallation Conference: Conduct conference at project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Warping (bow, cup, or twist) more than 1/4-inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section.
   b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 76.2-mm) span.
2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Exterior Doors: Five years from date of Substantial Completion.
4. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
1. VT Industries.
2. Mohawk Flush Doors, Inc.
3. Substitutions under provisions of Section 016000.

2.2 DOOR CONSTRUCTION, GENERAL

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Standard Duty.

C. WDMA I.S.1-A Performance Grade:

1. Heavy Duty unless otherwise indicated.

D. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade LD-2 made with binder containing no urea-formaldehyde resin.
2. Blocking: Provide wood blocking in particleboard-core doors as follows:

    a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
    b. 5-inch (125-mm) bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
    c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit device

E. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

F. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as follows:

    a. 5-inch (125-mm) top-rail blocking.
    b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have protection plates.
    c. 5-inch (125-mm) midrail blocking, in doors indicated to have armor plates.
    d. 4-1/2-by-10-inch (114-by-250-mm) lock blocks and 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.

3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 PLASTIC-LAMINATE-FACED DOORS

A. Interior Solid-Core Doors

1. Grade: Custom.
2. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS
    a. Facing Interior: Wilson Art #7935K-07 Shaker Cherry
3. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range of products.
4. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.
5. Core: Particleboard

6. Construction: Five plies. Stiles and rails are bonded to core, then entire unit abrasive planed before faces and crossbands are applied. Faces are bonded to core using a hot press.
7. WDMA I.S.1-A Performance Grade: Standard Duty.

2.4 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Cut and trim openings through doors in factory.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, mortises, tops, and bottoms.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and install door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.

1. Clearances: Provide 1/8 inch (3.2 mm) at heads, jambs, and between pairs of doors. Provide 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch (6.4 mm) from bottom of door to top of threshold unless otherwise indicated.

a. Comply with NFPA 80 for fire-rated doors.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

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. Access doors and frames for walls and ceilings.
2. Floor access doors and frames.

B. Related Requirements:

1. Section 077200 - Roof Accessories: For roof hatches.
2. Section 233113 - Metal Ducts: Accessories for heating and air-conditioning duct access doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings**,** materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches (75 by 125 mm) in size, in specified finish.

D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Nystrom. RA/RW/RP Series
   2. Nystrom RUT/RUW Series

B. Source Limitations: Obtain each type of access door and frame from single source from a single manufacturer.

C. Flush Access Doors with Concealed Flanges:

   1. Basis-of-Design Product: Nystrom RW Series
   2. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
   3. Locations: Wall and ceiling.
   4. Door Size: Refer to drawings for sizes and locations.
   5. Uncoated Steel Sheet for Door: Nominal 0.036 inch (.92 mm), 20 gage.
      a. Finish: Phosphate dipped with factory primer.
   6. Frame Material: Nominal 0.060 inch (1.52mm) 16 gage in same material as door.
   7. Hinges: Concealed continuous piano hinges.
   8. Hardware: Cylinder lock. Minimum of two (2) keys per door

D. Recessed Access Door to accept tile finishes at wall locations

   1. Basis of Design Product: Nystrom RUT/RUW series
   2. Door: Fabricate from 16-gauge cold rolled sheet steel recessed 5/8 inch for in-fill of material.
   3. Frame: Fabricate from 16-gauge cold rolled sheet steel of configuration to suit material application.
      a. RUT/RUW-Wallboard surfaces – 22-gauge galvanized drywall bead at perimeter.
   4. Hinge: Concealed pivoting rod.
   5. Latching: Key operated cylinder cam lock with 2 keys per lock, keyed alike.
   6. Finish: Phosphate dipped with factory applied prime coat.
   7. Locations: Wall and ceiling.
   8. Door Size: Refer to drawings for sizes and locations.

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316. Remove tool, die marks, and stretch lines or blend into finish.

D. Aluminum Extrusions: ASTM B 221M, Alloy 6063-T6.

E. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

F. Aluminum Sheet: ASTM B 209M, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2M.

G. Frame Anchors: Same type as door face.

H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
2. Provide mounting holes in frames for attachment of units to metal framing.
3. Provide mounting holes in frame for attachment of masonry anchors.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.

2.4 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

E. Aluminum Finishes:
1. Clear Anodic Finish: AAMA 611,AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084110 - ALUMINUM STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: Conditions of the Contract, Division 1 - General Requirements, and Drawings apply to Work of this Section.

B. Section Includes:
1. Storefront system, complete with reinforcing, fasteners, anchors, and attachment devices.
2. Accessories necessary to complete work.

C. Products Furnished But Not Installed Under This Section:
1. Anchoring devices which are built into masonry.
2. Anchoring devices which are cast in concrete.

D. Related Sections:
1. Section 014000 - Quality Requirements.
2. Section 013300 - Submittal Requirements
3. Division 05 - Metals.
4. Section 061000 - Rough Carpentry.
5. Section 072100 - Thermal and Acoustical Insulation.
6. Section 079200 - Joint Sealants.
7. Division 08 - Openings.
8. Section 087100 - Finish Hardware.
9. Section 088000 - Glazing.

1.2 REFERENCES

A. Aluminum Association (AA):
1. DAF-45 Designation System for Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):
1. 501 Methods of Test for Exterior Walls.
2. 501.2 Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
3. 2605 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
4. 611 Voluntary Specification for Anodized Architectural Aluminum.
5. 701 Voluntary Specifications for Pile Weatherstripping and Replaceable Fenestration Weatherseals.
6. CW-10 Care and Handling of Architectural Aluminum from Shop to Site.
7. SFM1 Aluminum Storefront and Entrance Manual.

C. American Society for Testing and Materials (ASTM):

1.	A36	Structural Steel.
2.	A123	Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3.	B209	Aluminum and Aluminum - Alloy Sheet and Plate.
4.	B221	Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
5.	E283	Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
6.	E330	Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
7.	E331	Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.

D. Glass Association of North America (GANA):
1. Glazing Manual

E. Federal Specifications (FS):

1.	TT-P-645B(SH)	Primer, Paint, Zinc Molybdate, Alkyd Type

F. Steel Structures Painting Council (SSPC):

1.	SP2	Hand Tool Cleaning.
2.	SP3	Power Tool Cleaning.
3.	Paint 12	Cold-Applied Asphalt Mastic (Extra Thick Film).

1.3 SYSTEM REQUIREMENTS

A. Design Requirements:
1. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
2. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
3. Provide concealed fastening.
4. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
5. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
6. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
7. Framing systems shall accommodate expansion and contraction movement due to surface temperature differentials of 180 degrees F without causing buckling, stress on glass, failure of joint seals, excessive stress on structural elements, reduction of performance, or other detrimental effects.

B. Performance Requirements:
   1. Wind loads: Provide framing system capable of withstanding wind load design pressures of 20 psf acting inward and 20 psf acting outward. The design pressures are based on the International Building Code; 2021 Edition.
   2. Air infiltration: Air leakage through fixed light areas of storefront shall not exceed 0.06 cfm per square foot of surface area when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
   3. Water infiltration: No uncontrolled leakage when tested in accordance with ASTM E331 at test pressure of 10 psf as defined in AAMA 501.
   4. Deflection: Maximum calculated deflection of any framing member in direction normal to plane of wall when subjected to specified design pressures for spans up to and including 13'-6" shall be limited to 1/240 of its clear span and for spans greater than 13'-6" deflection shall be limited to 1/240 of its clear span + 1/4", except that maximum deflection of members supporting plaster surfaces shall not exceed 1/360 of its span.

C. Testing Requirements: Provide components that have been previously tested by an independent testing laboratory.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data:
   1. Submit manufacturer's descriptive literature and product specifications.
   2. Include information for factory finishes, hardware, accessories, and other required components.

C. Shop Drawings:
   1. Submit shop drawings covering fabrication, installation and finish of specified systems.
   2. Include following:
      a. Fully dimensioned plans and elevations with detail coordination keys.
      b. Locations of exposed fasteners and joints.
   3. Provide detailed drawings of:
      a. Composite members.
      b. Joint connections for framing systems and for entrance doors.
      c. Anchorage.
      d. System reinforcements.
      e. System expansion and contraction provisions.
      f. Glazing methods and accessories.
      g. Internal sealant requirements.
   4. Schedule of finishes.

D. Samples:
   1. Submit manufacturers standard samples indicating quality of finish.
   2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
   3. Submit samples for each type of glass, 12 x 12 inch size if not submitted under Section 088000.

E. Test Reports:
   1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.

F. Qualification Data:
   1. Submit installer qualifications verifying years of experience.
   2. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.

B. Installer Qualifications: Certified in writing by system manufacturer as qualified for installation of specified systems.

C. Perform Work in accordance with AAMA SFM1 and manufacturer's written instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016000.

B. Protect finished surfaces as necessary to prevent damage.

C. Do not use adhesive papers or sprayed coatings that become firmly bonded when exposed to sun.

D. Do not leave coating residue on any surfaces.

E. Replace damaged units.

1.7 WARRANTY

A. Provide warranties in accordance with Section 017000.

B. Provide written warranty in form acceptable to Owner jointly signed by manufacturer, installer and Contractor warranting work to be watertight, free from deflective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within five (5) years from date of Substantial Completion.

C. Warranty shall cover following:
   1. Complete watertight and airtight system installation within specified tolerances.
   2. System is structurally sound and free from distortion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Subject to compliance with requirements indicated, provide products by one of the following:
   1. Oldcastle Building Envelope, Center Glazed, Series 3000.
   2. Kawneer 451 Trifab Versa Glaze -Thermally broken
   3. Substitutions: Submit under provisions of Section 016000.

B. Storefront Framing System: Basis of Design

   1. Center Glazed System, Series 3000: 2” x 4 ½” mullion profiles accommodate 1” inch glazing. Thermally Broken

   2. Doors: Standard duty systems (0.125" wall thickness; 1-3/4" deep) Model 375 - medium stile (10"bottom rail, 3-1/2" top rail, 4-1/4" verticals)

2.2 EXTERIOR ALUMINUM DOOR / FRAME COMPONENTS

A. Frame: 2 inches x 4 inches nominal dimension; flush glazing stops.
B. Medium Doors: 1 3/4 inches (44 mm) thick, 3.5 inch (89 mm) wide top rail, 3.5 inch (89 mm) wide vertical stiles, 10 inches wide bottom rail.
C. Sash Stops: 1 7/16 inch X 11/16 inch (37 x 17 mm) sash stop.
D. Door Hardware: Furnish hardware as required for all doors under this section. See hardware schedule in the drawings for required hardware.

2.3 FRAMING MATERIALS AND ACCESSORIES

A. Aluminum:
   1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.

B. Internal Reinforcing:
   1. ASTM A36 for carbon steel.
   2. Shapes and sizes to suit installation.
   3. Steel components factory coated TT-P-645B(SH) Primer, Paint, Zinc Molybdate, Alkyd Type

C. Anchorage Devices:
   1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.
   2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 2.0 ounce minimum coating.

D. Fasteners:
   1. Aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with items being fastened.
   2. Provide concealed fasteners wherever possible.

3. For exposed locations, provide Phillips flathead screws with finish matching item fastened.
4. For concealed locations, provide manufacturer's standard fasteners.

E. Expansion Anchor Devices: Lead-shield or toothed-steel, drilled-in, expansion bolt anchors.

F. Protective Coatings: Cold-applied asphalt mastic complying with SSPC, compounded for 30 mil thickness for each coat; or alkyd type zinc molybdate primer.

G. Touch-Up Primer for Galvanized Components: Zinc oxide conforming with FS TT-P-641.

H. Glazing Gaskets:
1. Compression type design, replaceable, molded or extruded, of neoprene, or ethylene propylene diene monomer (EPDM).
2. Profile and hardness as required to maintain uniform pressure for watertight seal.

I. Weatherstripping:
1. Wool pile conforming to AAMA 701.2.
2. Provide EPDM or vinylblade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

J. Internal Sealants and Baffles.

2.4 GLASS AND GLAZING ACCESSORIES

A. Refer to Section 088000.

2.5 FABRICATION

A. Coordination of Fabrication:
1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
2. Fabricate units to withstand loads that will be applied when system is in place.

B. General
1. Conceal fasteners wherever possible.
2. Reinforce work as necessary for performance requirements, and for support to structure.
3. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators, which will prevent contact and corrosion.
4. Comply with Section 088000 for glazing requirements.

C. Aluminum Framing:
1. Provide members of size, shape and profile indicated, designed to provide for glazing from exterior.
2. Fabricate frame assemblies with joints straight and tight fitting.
3. Reinforce internally with structural members as necessary to support design loads.
4. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
5. Seal horizontals and direct moisture accumulation to exterior.
6. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
7. Provide manufacturer's extrusions and accessories to accommodate expansion and contraction due to temperature changes without detrimental to appearance or performance.

D. Welding:
1. Comply with recommendations of the American Welding Society.
2. Use recommended electrodes and methods to avoid distortion and discoloration.
3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.

E. Flashings: Form from sheet aluminum with same finish as extruded sections. Apply finish after fabrication. Material thickness as required to suit condition without deflection or "oil-canning".

2.6 FINISHES

A. Clear Anodized:
1. Conforming to AA-M12C22A31 and AAMA 611.
2. Architectural Class II, etched, medium matte, clear anodic coating, 0.4 mil minimum thickness.

B Color Anodized:
1. Conforming to AA-M12C22A44 and AAMA 611.
2. Architectural Class II, etched, medium matte, colored anodic coating, 0.4 mil minimum thickness as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 01400.

3.2 INSTALLATION

A. Erection Tolerances:
1. Limit variations from plumb and level:
a. 1/8 inch in 10'-0" vertically.
b. 1/8 inch in 20'-0" horizontally.
2. Limit variations from theoretical locations: 1/4 inch for any member at any location.

3. Limit offsets in theoretical end-to-end and edge-to-edge alignment: 1/16 inch from flush surfaces not more than 2 inches apart or out-of-flush by more than 1/4 inch.

B. Install doors and hardware in accordance with manufacturer's printed instructions.

C. Set units plumb, level and true to line, without warp or rack of frame.

D. Anchor securely in place, allowing for required movement, including expansion and contraction.

E. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or preformed separators to prevent contact and corrosion.

F. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weather-tight construction.

G. Coordinate installation of perimeter sealant and backing materials between assemblies and adjacent construction in accordance with requirements of Section 079200.

H. Glazing: Refer to requirements of Section 088000.

3.3 ADJUSTING

A. Test door operating functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

3.4 CLEANING

A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.

B. Clean metal surfaces, exercise to avoid damage.

END OF SECTION 084110

SECTION 08 71 00 FINISH HARDWARE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section comprises of furnishing and installing hardware specified herein and noted on drawings for a complete and operational system, including any electrified hardware components, systems, controls and hardware for aluminum entrance doors. Any door shown on the drawing and not specifically referenced in the hardware sets shall be provided with identical hardware as specified on other similar openings and shall be included in the general contractors and finish hardware suppliers bid. All doors that are fire rated shall be provided with fire rated hardware to comply with the local code requirements whether specified that way or not as a part of the general contractor and hardware supplier's base bid. The general contractor and hardware supplier shall coordinate cylinder types with all door manufacturers prior to submittal of finish hardware. There will be no additional change orders issued on this project due to the general contractor and hardware supplier's failure to include any hardware item required by fire code or required for functional and/or proper installation of hardware items due to failure to coordinate with other trades and/or related products as listed in 1.03 of this specification.

B. Items include but are not limited to the following:

1. Hinges & Continuous Hinges
2. Flush Bolts
3. Exit Devices
4. Locksets and Cylinders
5. Push Plates – Pulls
6. Closers
7. Kick, Mop and Protection Plates
9. Stops, Wall Bumpers, Overhead Controls
10. Thresholds, Seals and Door Bottoms
11. Silencers
13. Miscellaneous Trim and Accessories
14. Electrified Hardware Items, Controls and Power Supplies
15. Wiring diagrams

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions, and Division 1 Specification sections, apply to this section.

1.03 RELATED WORK

Specified elsewhere that should be examined for its effect upon this section:

1. Section 013300 - Submittal Requirements
2. Section 081214 - Standard Steel Frames.
3. Section 081314 - Standard Steel Doors.

4. Section 0814 6 - Flush Wood Doors.
5. Section 084113 - Aluminum-Framed Entrances and Storefronts.
6. Division 26 - Electrical.

1.04 REFERENCES SPECIFIED

In this section subject to compliance as directed:

A. NFPA-80-2010 - Standard for Fire Doors and Windows
B. NFPA-101-2010 - Life Safety Code
C. ADA - The Americans with Disabilities Act - Title III - Public Accommodations
D. ANSI-A 117.1 - American National Standards Institute - Accessible and Usable Buildings and Facilities
E. ANSI-A 156.5 - American National Standards institute -Auxiliary Locks and Associated Products
F. UFAS - Uniform Federal Accessibility Standards
G. UL - Underwriter's Laboratories
H. WHI - Warnock Hersey International, Testing Services
I. State and Local Codes including Authority Having Jurisdiction
J. U.B.C.7-2-97 and UL10C
K. IBC-2009-International Building Code
L. BHMA – Builder's Hardware Manufacturer's Association
M. DHI – Door and Hardware Institute
N. NFPA-70-2010 – National Electrical Code

1.05 SUBMITTALS

A. Hardware Schedules:

1. Submit copies of schedule in accordance with Division 1, General Requirements. Schedule to be in vertical format, listing each door opening, including handing of opening, all hardware scheduled for opening or otherwise required to allow for proper function of door opening as intended, and finish of hardware. At doors with door closers or door controls include degree of door opening. Supply the schedules for all Finish Hardware within two (2) weeks from date purchase order is received by the hardware supplier.

B. Submit manufacturer's cut/catalog sheets on all hardware items and any required special mounting instructions with the hardware schedule.

C. Certification of Compliance:

1. Submit any information necessary to indicate compliance to all of these specifications as required.
2. Submit a statement from the manufacturer that electronic hardware and systems being supplied comply with the operational descriptions exactly as specified.

D. Submit any samples necessary as required by the Architect.

E. Templates for finish hardware items to be sent to related door and frame suppliers within three (3) working days of receipt of approved hardware schedule.

F. Doors and Frames used in positive pressure opening assemblies shall meet U.B.C. 7-2-97 and UL10C in areas where this specification includes Seals for smoke door.

1.06 QUALITY ASSURANCE

A. Hardware supplier to be a qualified, Factory Authorized, direct distributor of the products to be furnished. In addition, the supplier to have in their regular employment a person of experience who will be made available at reasonable times to consult with the Architect/Contractor and/or Owner regarding any matters affecting the finish hardware on this project.

B. All hardware used in labeled fire or smoke rated openings to be listed for those types of openings and bear the identifying label or mark indicating UL. (Underwriter's Laboratories) approved for fire. Exit devices in non-labeled openings to be listed for panic.

1.07 DELIVERY, HANDLING AND PACKAGING

A. Furnish all hardware with each unit clearly marked and numbered in accordance with the hardware schedule. Include door and item number for each.

B. Pack each item of hardware complete with all necessary parts and fasteners.

C. Properly wrap and cushion each item to prevent scratches and dents during delivery and storage.

1.08 SEQUENCING AND SCHEDULING

Any part of the finish hardware required by the frame or door manufacturers or other suppliers that is needed in order to produce doors or frames is to be sent to those suppliers in a timely manner, so as not to interrupt job progress.

1.09 WARRANTY

All finish hardware shall be supplied with a Two- (2) year warranty against defects in materials and workmanship, commencing with substantial completion of the project except as follows:

1. All Closers to have a ten- (10) year written warranty.
2. All Exit Devices to have a three- (3) year written warranty.
3. All Grade 1 Locksets to have a seven- (7) year written warranty.
4. All Continuous Hinges to have a ten- (10) year written warranty.

PART 2 PRODUCTS

2.01 FASTENERS

A. Furnish with finish hardware all necessary screws, bolts and other fasteners of suitable size and type to anchor the hardware in position for a long life under hard use.

B. Furnish fastenings where necessary with expansion shields, toggle bolts and other anchors designated by the Architect according to the material to which the hardware is to be

applied and the recommendations of the hardware manufacturer. All closers and exit devices on labeled wood doors shall be through-bolted if required be the door manufacturer. All thresholds shall be fastened with machine screws and anchors. Where specified in the hardware sets, security type fasteners of the type called for are to be supplied.

C. Design of all fastenings shall harmonize with the hardware as to material and finish.

2.02 ENVIRONMENTAL CONCERN FOR PACKAGING

The hardware shipped to the job site is to be packaged in biodegradable packs such as paper or cardboard boxes and wrapping. If non-biodegradable packing such as plastic, plastic bags or large amounts of Styrofoam is utilized, then the Contractor will be responsible for the disposal of the non-biodegradable packing to a licensed or authorized collector for recycling of the non-biodegradable packing.

2.03 HINGES

A. All hinges to be of one manufacturer as hereafter listed for continuity and consideration of warranty. Provide one of the following manufacturers Select, Hager or Ives.

B. Unless otherwise specified provide five-knuckle, heavy-duty, ball-bearing, button tip, full mortise template type hinges with non-rising loose pins. Provide non-removable pins for out swinging doors at secured areas or as called for in this specification. Refer to Hardware Schedule as shown on the drawings.

C. Exterior Door Hinges

1. Provide out-swinging door hinges of solid bronze, steel, aluminum or stainless steel with non-removable pins or security studs as called for in this specification Refer to Hardware Schedule as shown on the drawings.

D. Interior Door Hinges

1. Steel plated to match specified finish shall be provided. Furnish three (3) hinges up to 90 inches high and one (1) additional hinge for every 30 inches or fraction thereof unless otherwise. Refer to Hardware Schedule as shown on the drawings.

E. Provide size 4½” x 4½” for all 1¾” thick doors up to and including 36 inches wide (1 1/2 pairs). Doors over 1¾” through 2¼” thick, use 5” x 5” hinges. Doors over 36 inches use 4 1/2” x 4 1/2” (2 pair) unless otherwise specified. Refer to Hardware Schedule as shown on the drawings.

F. Were required to clear the trim and/or to permit the doors to swing 180 degrees furnish hinges of sufficient throw.

G. Provide heavy weight hinges on all doors over 36 inches in width.

H. At labeled door's steel or stainless steel, ball-bearing-type hinges shall be provided. For all doors equipped with closers provide ball-bearing-type hinges.

I. Finishes

1. At wood doors, hinges are to be plated to match adjacent hardware or as called for in 3.02 Hardware Sets.
2. At hollow metal doors, hinges are to be aluminum or stainless steel at exterior out-swinging doors, unless otherwise specified. Refer to Hardware Schedule as shown on the drawings.

J. Continuous hinges, where indicated, shall be Ives "112HD, 112HD-EPT, 600, 600-EPT or 700 series as specified or equal products manufactured by Select. Hinges shall be fire rated up to 90 minute and shall have been tested to carry a maximum door weight of 450 plus pounds. Refer to Hardware Schedule as shown on the drawings.

2.04 LOCK AND LOCK TRIM

A. All of the locksets, latch sets, and trim to be of one manufacturer as hereafter listed for continuity of design and consideration of warranty. Locks, passage sets, and privacy sets shall be the product of Schlage Lock Co., "ND" series with Sparta lever (No Substitutions Allowed). All locks, passage and privacy sets are to be provided in a US10B (613) finish. All locks and cylinders shall be prepared for Schlage cores in the key section required to match the existing. Verify the key section prior to fabrication or ordering. Refer to Hardware Schedule as shown on the drawings.

B. Provide metal wrought box strike boxes and curved lip strikes with proper lip length to protect trim of the frame, but not to project more than 1/8 inch beyond frame trim or the inactive leaf of a pair of doors.

C. Mechanical Locks shall meet ANSI Operational Grade 1, Series 4000 as specified in 3.02 Hardware Sets.

1. Hand of lock is to be easily reversible in the field or non-handed.
2. All lever trim is to be through-bolted through the door.

2.05 PERMANENT CYLINDERS, KEYING AND ACCEPTABLE SUPPLIERS

A. The hardware supplier shall provide locks and Exit devices requiring cylinders prepared for Schlage 6 pin key system and comply with performance requirements of ANSI A156.5. All keys shall be manufactured of nickel silver material only. All cylinders are to be keyed to the existing system. (No Substitutions Allowed). Refer to Hardware Schedule as shown on the drawings.

1. Key as directed by Architect to Owner's keying system and provide two (2) master keys to Owner and two (2) keys for each lock set provided.

2.06 EXIT DEVICES

A. All exit devices and trim, including electrified items, to be of one manufacturer (VonDuprin) as hereafter listed and in the hardware sets for continuity of design and consideration of warranty. Refer to Hardware Schedule as shown on the drawings.

B. Exit Devices to be "UL" listed for life safety. All exit devices for labeled doors shall have "UL" label for "Fire Exit Hardware." All devices mounted on labeled wood doors are to be through-bolted or per the manufacturer's listing requirements. All devices shall conform to NFPA 80 and NFPA 101 requirements.

C. All exit devices to be of a heavy duty, chassis mounted design, with one-piece removable covers, eliminating necessity of removing the device from the door for standard maintenance and keying requirements.

D. All trims to be through-bolted to the lock stile case. Lever design to be the same as specified with the lock sets (#17/SPA).

E. Exit Devices to be the modern push rail design. Finish shall be dark bronze (313).

F. All devices shall carry a three- (3) year warranty against manufacturing defects and workmanship.

G. Exit Devices shall be convertible in the field to accept electrified operations without purchasing completely new exit devices.

J. Exit Devices shall be Von Duprin 99 or 33 series as specified (No Substitution).

2.07 SURFACE-MOUNTED DOOR CLOSERS

A. All closers for this project shall be the products of a single manufacturer for continuity of design and consideration of warranty. All door closers shall be mounted so as to achieve the maximum degree of opening (trim permitting). Refer to Hardware Schedule as shown on the drawings.

B. All closers to be heavy duty, surface-mounted, fully hydraulic, rack and pinion action with high strength cast iron cylinder to provide control throughout the entire door opening cycle. All closers shall have been tested and passed a ten million-cycle test.

C. Size all closers in accordance with the manufacturer's recommendations at the factory.

D. All closers to have adjustable spring power sizes 1 through 4 or 6 as specified and separate tamper resistant, brass, non-critical regulating screw valves for closing speed, latching speed and back-check control as a standard feature unless specified other wise.

E. All closer covers to be rectangular, full cover type of non-ferrous, non-corrosive material painted to match closer.

F. Closer to have heavy-duty arms. All closer arms shall be of sufficient length to accommodate the reveal depth and to insure proper installation.

G. Supply appropriate arm assembly for each closer so that closer body and arm are mounted on non-public side of door opening and on the interior side of exterior openings, except where required otherwise in the hardware sets.

1. All parallel arm mounted closers to be factory indexed to insure proper installation.
2. Furnish heavy-duty cold forged parallel arms for all parallel arm mounted closers.

H. Provide closers with special application and heavy-duty arms as specified in the hardware sets or as otherwise called for to insure a proper operating, long lasting opening.

I. Finish: Sprayed enamel finish shall match other hardware.

J. Closers shall be LCN 1461 and 2030 series with the SCUSH, SHCUSH, Reg or RA arm as specified (No Substitutions Allowed).

2.08 AUTOMATIC DOOR OPENERS

A. All automatic door openers where shown shall be:

1. LCN #9531 STD - Single (Pull Side Mount)
2. LCN #9542 REG - Single (Push Side Mount)
3. LCN #9553 REG2 - Double (Push Side Mount) simultaneous
4. LCN #9553 STD2 - Double (Pull Side Mount) simultaneous

B. Provide two (2) each Hard Wired Actuators as specified.
C. Provide Surface Mounted Box Kit with exterior Actuator, Model No. 8310-868F.

2.09 DOOR STOPS AND HOLDERS

A. Door stops are to be furnished for every door leaf. Every door is to have a floor, wall, or an overhead stop.

B. Place doorstops in such a position that they permit maximum door swing, but do not present a hazard of obstruction. Furnish floor strikes for floor holders of proper height to engage holders of doors. The contractor shall place wood blocking in all stud walls specified and scheduled to receive wall stops.

C. Where overhead stops and holders are specified, or otherwise required for proper door operation, they are to be heavy duty and of extruded brass, bronze or stainless steel with no plastic parts as specified.

D. Finish: Same as other hardware where available.

E. Acceptable Products

1. Floor and wall stops as listed in hardware sets. Equivalent products as manufactured by Ives, Hager and Trimco are acceptable. Refer to Hardware Schedule as shown on the drawings.

2.10 PUSH PLATES, DOOR PULLS, AND KICKPLATES

A. All push plates, door pulls, kick plates and other miscellaneous hardware as listed in hardware sets. Equivalent products as manufactured by Ives, Hager and Trimco are acceptable. Refer to Hardware Schedule as shown on the drawings.

B. Kick plates to be 10 inches high and Mop plates to be 6 inches high, both by 2 inches or 1 inch less than door width (LDW) as specified. They are to be of 16 gauge (.050 inches) thick. For door with louvers or narrow bottom rails, kick plate height to be 1 inch less dimension shown from the bottom of the door to the bottom of the louver or glass.

C. Where required armor plates, edge guards and other protective hardware shall be supplied in sizes as scheduled in the hardware sets. Refer to Hardware Schedule as shown on the drawings.

D. Finish: Same as other hardware where available.

2.11 FLUSH BOLTS AND COORDINATORS

A. Provide Flush bolts with Dust Proof Strikes as indicated in the individual hardware sets by Glynn Johnson, Ives, Hager and Trimco are acceptable. Finish shall match adjacent hardware.

B. Provide and install only at locations approved by code.

2.12 THRESHOLDS AND SEALS

A. Provide materials and finishes as listed in hardware sets. Equivalent product by National Guard Products, Reese, and Pemko are acceptable. All thresholds must be in accordance with the requirements of the ADA and ANSI A117.1. Refer to Hardware Schedule as shown on the drawings.

B. Provide thresholds with wood screws and plastic anchors. Supply all necessary anchoring devices for weather strip and sound seal.

C. Seals shall comply with requirements of U.B.C. 7-2-97 and UL10C. All thresholds, door bottoms and weather stripping shall be provided with silicone inserts as specified in 3.02 Hardware Sets.

D. Seals shall comply with the requirements of the Wood Door Manufacturer’s certification requirements.

2.13 FINISHES

A. Finishes for all hardware are as required in this specification and the hardware sets.

B. Special care is to be taken to make uniform the finish of all various manufactured items.

2.14 DOOR SILENCERS AND KEY CABINET

A. Provide door silencers at all openings without gasket. Provide two- (2) each at each pair of doors and three (3) or four- (4) each for each single door (coordinate with the frame manufacturer).

B. Provide a key cabinet Lund 1200 series equal to the total number of permanent cores plus 100% expansion and shall be turned over to the district lock shop for installation.

2.15 PROPRIETARY PRODUCTS

A. References to specific products are used to establish quality standards of utility and performance. Unless otherwise approved provide only the specified product.

B. All other materials, not specifically described, but required for a complete and proper finish hardware installation, are to be selected by the Supplier, subject to the approval of the Architect and Owner.

C. Architect and Owner reserve the right to approve all the substitutions proposed for this specification. All requests for substitution to be made prior to bid in accordance with Division 1, General Requirements, and are to be in writing, hand delivered to the Architect. Two (2) copies of the manufacturer's brochures and a physical sample of each item in the appropriate design and finish shall accompany requests for substitution.

PART 3 EXECUTION OF AND/OR INSTALLATION

3.01 INSTALLATION OF FINISH HARDWARE

A. Hardware is to be installed by experienced finish hardware installers with a minimum of ten (10) years experience in the installation of finish hardware.

B. Check hardware against the reviewed hardware schedule upon delivery. Store the hardware in a dry and secure location to protect against loss and damage.

C. Install finish hardware in accordance with approved hardware schedule and manufacturers' printed instructions. Pre-fit hardware before finish is applied to door; remove and reinstall after finish is complete and dry. Install and adjust hardware so that parts operate smoothly, close tightly, and do not rattle.

D. Mortise and cutting to be done neatly, and evidence of cutting to be concealed in the finished work. Protect all Finish hardware from scratching or other damage.

3.02 FINISH HARDWARE SCHEDULE

A Refer to hardware schedule as listed on the drawings

END OF SECTION 087100

SECTION 088000 - GLAZING

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. Section 013300 - Submittal Requirements

PART 2 - SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Doors.
3. Glazed curtain walls.
4. Storefront framing.
5. Glazed entrances.

B. Related Sections:

1. Division 08 - Openings.

C. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

D. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

E. Interspace: Space between lites of an insulating-glass unit.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
   1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
      a. Basic Wind Speed: 90 mph (40 m/s).
      b. Importance Factor: III.
      c. Exposure Category: B.
   2. Design Snow Loads: 5 pounds per square foot.
   3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.3 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass] [the following products: 12 inches (300 mm) square.

   1. Clear and Tinted glass.
   2. Coated glass.
   3. Insulating glass.

C. Glazing Accessory Samples: For gaskets sealants and colored spacers, in 12-inch (300-mm) lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Qualification Data: For installers and manufacturers of insulating-glass units with sputter-coated, low-e coatings

G. Product Certificates: For glass and glazing products, from manufacturer.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass coated glass insulating glass glazing sealants and glazing gaskets.

   1. For glazing sealants, provide test reports based on testing current sealant formulations within the previous 36-month period.

I. Complete Materials Documentation Submittal Sheet for each product and provide required information for the complete documentation the AEGB credits listed for all glazing on the project:

1. Materials and Resources Credit 4, Recycled Content.

2. Materials and Resources Credit 5, Texas Sourced Material.

3. Indoor Environmental Quality Credit 7a, Low-Emitting Materials, Sealants and Adhesives.

4. Material and Resources Credit 8, Low VOC Paints, Coatings, Adhesives, and Sealants:

J. Preconstruction adhesion and compatibility test report.

K. Warranties: Sample of special warranties.

2.4 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Source Limitations for Glass: Obtain clear float glass tinted float glass coated float glass and insulating glass from single source from single manufacturer for each glass type.

D. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

E. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use.

F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install glazing in mockups specified in Division 08 – Openings to match glazing systems required for Project, including glazing methods.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

2.5 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

2.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F (4.4 deg C).

2.7 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

   1. Warranty Period: Ten (10) years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

   1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 3 - PRODUCTS

3.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than .25 inch (6.0 mm).
2. Thickness of Clear or Tinted Glass: Provide same thickness for each clear or tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites .25 inch (6.0 mm) thick
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

3.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Guardian Industries Corp.; Ultrawhite.
   b. Pilkington North America; Optiwhite.
   c. Vitro Industries, Inc.; Starphire.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated. All glass with roller wave distortion is subject to rejection by the Architect if esthetically unacceptable.
2. For uncoated glass, comply with requirements for Condition A.

3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3, and complying with other requirements specified.

1. Products: Subject to compliance with requirements, provide products by one of the following, but are not limited to, the following:
   a. Guardian Industries Corp.;
   b. Pilkington North America;.
   c. Vitro Industries, Inc.
2. Ceramic Coating Color: Subdued Gray V903 or equal.

3.3 INSULATING GLASS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Vitro Architectural Glass, formally PPG Industries, Inc.

2. Substitution per Architect’s approval.

B. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other specified requirements.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
2. Spacer: Manufacturer's standard spacer material and construction
3. Desiccant: Molecular sieve or silica gel, or blend of both.

C. Insulated Glass Unit Type: Comply with applicable requirements in “Glass Products” Article as indicated by designations in “Insulating-Glass Types” Article.

1. Glazing at Exterior storefront doors.
   Products: Subject to compliance with requirements, provide the following.
   a. Outside Lite: Vitro Architectural Glass Solarban 60 on Starphire (2) Clear.
   b. Inside Lite: Vitro Architectural Glass Clear.
   c. Visible Light Transmittance: 64%.
   d. U-Value: 0.40 average.
   e. Shading: Coefficient: 0.32.
   f. Solar Heat Gain Coefficient: 0.27.

2. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating-Glass Types" Article.
   Products: Subject to compliance with requirements, provide the following:
   a. Outside lite: Vitro Architectural Glass Solarban 60 (2) on Solargray
   b. Inside lite: Vitro Architectural Glass Clear.
   c. Visible Light Transmittance: 44%
   d. U-Value: 0.29 average
   f. Solar Heat Gain Coefficient: 0.22.

3. Spandrel Glass: Products: Subject to compliance with requirements, provide the following:
a. Outside lite: Vitro Architectural Glass Solarban 60 (2) on Solargray.
b. Inside Lite: Glass Clear (4) warm gray Ceramic-coated spandrel glass, heat-strengthened float glass.
c. Pin mounted R-13, semi-rigid fiberglass insulation.

3.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
2. Silicone complying with ASTM C 1115.
3. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene silicone or thermoplastic polyolefin rubber] gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

D. Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements,
a. Dow Corning Corporation; 795
b. Pecora Corporation; 895
c. Tremco Incorporated; Spectrum 2

2. Applications: Apply to aluminum frames in contact with adjacent architectural surfaces such as precast concrete, stone, plaster, and gypsum board.

3.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

3.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

3.7 MONOLITHIC-GLASS TYPES

A. Glass Type GL-01: Clear fully tempered float glass.

1. Thickness: 0.25 inch (6.0 mm).
2. Provide safety glazing labeling.
3. Provide at interior and exterior doors, windows, and side lites as scheduled.

B. Glass Type GL-02: Ultraclear fully tempered float glass.

1. Thickness: 0.25 inch (6.0 mm).
2. Provide safety glazing labeling.
3. Provide at interior and exterior doors, storefront, windows, and side lites as scheduled

3.8 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.10 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

    1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

    2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.11 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.12 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1. Section 013300 - Submittal Requirements

1.2 SUMMARY

A. This Section includes the following types of silvered flat glass mirrors.
1. Annealed monolithic glass mirrors.

B. Related Sections include the following:
1. Section 088000 "Glazing" for glass with reflective coatings used for vision and spandrel lites.
2. Section 108000 "Toilet and Service Accessories" for metal-framed mirrors.

1.3 DEFINITIONS

A. Deterioration of Mirrors: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1.4. PERFORMANCE REQUIREMENTS

A. Provide mirrors that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

1.5 SUBMITTALS

A. Product Data: For the following:
1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
2. Mirror hardware.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Samples: For each type of mirror product required, in the form indicated below:
1. Mirrors, 12 inches (300 mm) square, including edge treatment on 2 adjoining edges.
2. Mirror clips.
3. Mirror trim, 12 inches (300 mm) long.

D. Product Certificates: For each type of mirror, signed by product manufacturer.

E. Qualification Data: For Installer.

1.6. QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed mirror glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirror installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under NGA's Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

B. Source Limitations for Mirrors: Obtain mirrors from one source for each type of mirror indicated.

C. Source Limitations for Mirror Glazing Accessories: Obtain mirror glazing accessories from one source for each type of accessory indicated.

D. Glazing Publications: Comply with the following published recommendations:
1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

1.7. DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.8. PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9. WARRANTY

A. Special Warranty: Manufacturer's standard form, made out to Owner: for project site, within specified warranty period indicated below:
1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. Manufacturers:
1. Samuels Glass Co., Inc.

B. Substitutions under provisions of Section 016000.

2.2. SILVERED FLAT GLASS MIRROR MATERIALS

A. Clear Glass Mirrors: ASTM C 1503, Mirror Select Quality.
1. Nominal Thickness: ¼ inch (6.0 mm).

2.3. MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

2.4. MIRROR HARDWARE

A. Mirror Bottom Clips: Manufacturer's standard

C. Mirror Top Clips: Manufacturer's standard.

D. Plated Steel Hardware: Formed-steel shapes with plated finish indicated.

E. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

F. Anchors and Inserts: Provide devices as required for mirror hardware installation.

G. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on gypsum board or ceramic tile faced walls and where indicated.

2.5 FABRICATION

A. Mirror Sizes: To suit project conditions, cut mirrors to final sizes and shapes.

B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Unless indicated otherwise, all mirrors are to be furnished in one piece without joints.

D. Mirror Edge Treatment: Flat polished edge.
1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.

B. Proceed with mirror installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. For wall-mounted mirrors, install mirrors with mirror hardware.
1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
2. For metal clips, place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges.
3. Where indicated, install bottom trim and top clips symmetrically placed and evenly spaced.

3.4. CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

END OF SECTION 088300

SECTION 092900 - GYPSUM BOARD

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. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

B. Related Requirements:

1. Division 06 - Wood, Plastics, and Composites.
2. Division 09 - Finishes.

1.3 ACTION SUBMITTALS

A. Documentation to be provided with completed Materials Documentation Submittal Sheet for each material; refer to Section 013300 – Submittal Procedures.

B. Submit product data sheets, installation instructions, environmental data and controls or products provided under work of this Section.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: 4 x 4 foot (122 cm x 122 cm) panel for each textured finish indicated and on same backing indicated for Work for initial selection.

1.4 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE 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 E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. All gypsum board products must be mined and produced within the continental United States and be manufactured for domestic use.

B. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than fifty percent (50%).

C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with the support system indicated.

D. Gypsum Board:

1. Recycled Content: Minimum 10 percent post-consumer recycled content, or minimum 20 percent pre-consumer recycled content at contractor's option.

E. Manufacturer Locations: Gypsum Board products shall be manufactured in Texas in the greatest quantities feasible.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. National Gypsum Company.
5. Temple-Inland.
6. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered

C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.

D. Reinforced Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements,provide one of the following:

    a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
    b. Temple Inland Green Glass.
2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10.

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide the following:
    a. National Gypsum Company, Permabase Cement Board.

2. Thickness: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D 3273, score of 10.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc
2. Shapes:

    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. L-Bead: L-shaped; exposed long flange receives joint compound.
    e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    f. Expansion (control) joint.
    g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by the following

   a. Fry Reglet Corp.
   b. Gordon, Inc.
   c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 , Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified .

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.
5. Reinforcing Tape: Toxicity / TEQ: Sheetrock Joint Tape. Paper; fibErglass joint tape not permitted.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
   a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish in lobby areas as indicated in the finish schedule on plans.
6. Joint-Treatment Materials: Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides and other slow releasing compounds.

D. Joint Compound for Exterior Applications:
   1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:
   1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

   1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly. In no assembly shall the fire developed exceed 25 or smoke develop exceed 50.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

   1. Products: Subject to compliance with requirements,provide one of the following:
      a. Pecora Corporation; AC-20 FTR.
      b. USG Corporation; SHEETROCK Acoustical Sealant.

   2. Acoustical joint sealant shall have a VOC content of 250> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

G. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

2.9 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Texture: Roller applied light orange peel.

1. Level 5 in lobby areas and at radius feature and noted on plans

2. Level 4 at all other locations

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces above ceilings, etc., except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.

2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings and where required for fire-resistance-rated assembly.
3. Flexible Type: As indicated on Drawings. Apply in double layer at curved assemblies.
4. Ceiling Type: As indicated on Drawings.
5. Glass-Mat Interior Type: As indicated on Drawings.
6. Acoustically Enhanced Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners if required for finishes.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

F. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus twelve (12)-inch- (300-mm-) long straight sections at ends of curves and tangent to them.

G. For double-layer construction, fasten base layer to studs with screws sixteen (16) inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced twelve (12) inches (300 mm) o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings or according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use[at exposed panel edges.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated on Drawings.

1. FreyReget
   a. DRM 625 375
   b. DRM 625 50

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints**,** rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile or where indicated on Drawings.
3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 4: At all panel surfaces that will be exposed to view unless otherwise indicated.

   a. Primer and its application to surfaces are specified in other Division 09 Sections.

5. Level 5: Where indicated on Drawings.

   a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Apply finish using rollers, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and 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.

END OF SECTION 092900

SECTION 093000 - TILING

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. Ceramic tile.
2. Waterproof membrane.
3. Crack isolation membrane.
4. Tile backing panels.
5. Metal edge strips.

B. Related Sections:

1. Section 079200 - Joint Sealants: For sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 - Gypsum Board: For cementitious backer units

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.60.
2. Step Treads: Minimum 0.80.
3. Ramp Surfaces: Minimum 0.80.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. VOC data:
   a. Adhesives:
      1) Submit manufacturer's product data for adhesives. Indicate VOC limits of the product. Submit MSDS highlighting VOC limits.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 48 inches (1200 mm) square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory
4. Metal edge strips in 6-inch (150-mm) lengths.

D. Qualification Data: For qualified Installer.

1. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

E. Product Certificates: For each type of product, signed by product manufacturer.

F. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Waterproof membrane.
2. Crack isolation membrane.
3. Joint sealants.
4. Cementitious backer units.
5. Metal edge strips.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of floor tile installation.
2. Build mockup of wall tile installation.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination can be avoided.

D. Store liquid materials in unopened containers and protect them from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

F. Accessories, Adhesives, Grouts, Sealants.

1. Adhesives: Water-resistant organic; ANSI A136.1.
   a. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials.

2.. Sealants:

   a. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials

3. Prepared Grouts:
   a. Toxicity/IEQ: Cement based, petroleum-free and plastic-free grout; ANSI A118.4.

2.2 TILE PRODUCTS

A. Tile Type: Slate Square Edged Porcelain tile.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
   a. Atlas
   b. Anatolio
2. Face Size: Refer to sheet A11.1, Security State Bank and Trust Branch Standard Finish Legend
3. Wearing Surface: Abrasive COF = >0.6
4. Finish: Mat, opaque.
5. Tile Color, Size, and Pattern: As indicated in the Finish Schedule and as listed below.

6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

   a. Base: As indicated in the Finish Schedule

B. General: Manufacturer's standard product, selected from the following**,** that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

C. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.

1. Products: Subject to compliance with requirements, provide the following

   a. Noble Company (The); Nobleseal TS.

D. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Products: Subject to compliance with requirements, provide the following:

a. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane or 9235 Waterproof Membrane.

2.3 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Chlorinated Polyethylene Sheet: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric; 0.030-inch (0.76-mm) nominal thickness.

1. Products: Subject to compliance with requirements, provide the following

a. Noble Company (The); Nobleseal CIS.

C. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.

1. Products: Subject to compliance with requirements, provide the following
a. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane or 9235 Waterproof Membrane.

2.4 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Custom Building Products.
b. Laticrete International, Inc.
c. MAPEI Corporation.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

B. Organic Adhesive: ANSI A136.1, Type I**,** with a VOC content of 65 g/L or less

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Bonsal American; an Oldcastle company.
a. Custom Building Products.
b. Laticrete International, Inc.
c. MAPEI Corporation.

2.5 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Atlas Minerals & Chemicals, Inc.
   b. Custom Building Products.
   c. Laticrete International, Inc.
   d. MAPEI Corporation.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.6 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Dow Corning Corporation; Dow Corning 786.
   b. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
   c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal base, designed specifically for flooring applications; half-hard brass exposed-edge material.

C. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F (49 to 60 deg C) per ASTM D 87.
2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not, factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with NTCA's "Handbook for Ceramic Tile, Glass, and Stone Tile Installation" for NTCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in NTCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
    a. Tile floors in wet areas.
    b. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile close to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
2. Quarry Tile: 3/16 inch (4.5 mm
3. Paver Tile: 3/8 inch (9.5 mm).
4. Glazed Wall Tile: 1/16 inch (1.6 mm).
5. Decorative Thin Wall Tile: 1/16 inch (1.6 mm).

F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Metal Edge Strips: Install at locations indicated where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.4 TILE BACKING PANEL INSTALLATION

A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions**.**

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR TILE INSTALLATION SCHEDULE

A. INTERIOR FLOOR TILE INSTALLATION

1. Tile Installation F122: Thin-set mortar on waterproof membrane; NTCA F122-11.

a. Tile Type: PFT 1- PFT 4 in wet areas.
b. Thin-Set Mortar: Latex- portland cement mortar. (ISO C2S1)
c. Grout: Water-cleanable epoxy grout. (ISO RG)

2. Tile Installation F115: Thin-set mortar (optional crack isolation membrane); NTCA F115-11.

a. Tile Type: PFT 1- PFT 4 in dry areas.
b. Thin-Set Mortar: Latex- portland cement mortar. (ISO C2S1
c. Grout: Water-cleanable epoxy grout (ISO RG)

B. Interior Wall Installations, Metal Studs or Furring:

1. Tile Installation W244: Thin-set mortar on cementitious backer units underlayment; NTCA W244-11. (ISO RG)

a. Tile Type: CWT-1
b. Thin-Set Mortar: Dry-set portland cement mortar.
c. Grout: Water-cleanable epoxy grout (ISO RG)

2. Tile Installation W245-11: Organic adhesive on cementitious backer units or coated glass-mat, water-resistant gypsum backer board; NTCA W245-11. (ISO RG)

    a. Tile Type: CWT-1
    b. Thin-Set Mortar: Organic adhesive.
    c. Grout: Water-cleanable epoxy grout (ISO RG)

END OF SECTION 093000

SECTION 095123 - ACOUSTICAL CEILINGS AND WALLS

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. Acoustical tiles for ceilings.
2. Acoustic ceiling tile suspension systems.
3. Acoustic wood-grained wall and ceiling system

B. Related Requirements:

1. Section 092900 - Gypsum Board: For ceilings consisting of gypsum board panels and metal framed or suspended suspension systems.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6-inches- (150-mm-) in size.

C. Samples for Initial Selection: For components with factory-applied color finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: 6-inch- (150-mm-) long Sample of each type.
3. Exposed Moldings and Trim: Set of 6-inch- (150-mm-) long Samples of each type and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Method of attaching hangers to building structure.
    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
5. Minimum Drawing Scale: 1/8 inch

B. Product Test Reports: For each acoustical tile ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Evaluation Reports: For each acoustical tile ceiling suspension system; and anchor and fastener type; from ICC-ES.

D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size tiles equal to one box for each type of tile installed.
2. Suspension-System Components: Quantity of each concealed grid and exposed component equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to the National Voluntary Laboratory Accreditation Program (NVLAP) for testing indicated.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials with Flame Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ACOUSTICAL TILES, GENERAL

A. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface according to ASTM E 795.

B. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3. ACOUSTICAL TILES: AU-1

A. Manufacturers: Subject to compliance with requirements, provide products by the following
1. Armstrong World Industries, Inc.

B. Classification: Provide tiles complying with ASTM E 1264 for type, form, and pattern as follows:
1. **AU-1** Armstrong 1814 Pueblo Beveled Tegular Lay-In with 15/16" grid
a. Type and Form: Type III, smooth texture, mineral base with painted finish; Form1, water felted
c. Color: White
e. NRC: Not less than0.70
f. CAC: Not less than 30
g. Edge/Joint Detail: Beveled, Tegular edges
h. Thickness: 3/4 inch.
i. Modular Size: 24 by 24 inches.

C. Provide acoustical tiles treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

D. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

2.5 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Armstrong World Industries, Inc.
   a. Superfine 9/16-inch exposed tee grid.

B. Direct-Hung, Double-Web, Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, G30 (Z90) coating designation.

1. Structural Classification: Intermediate-duty system.
2. Access: Upward and end pivoted, with initial access openings of size indicated below and located throughout ceiling within each module formed by main and cross runners, with additional access available by progressively removing remaining acoustical tiles.
   a. Initial Access Opening: In each module, 24 by 24 inches (610 by 610 mm).
3. Provide hold down clips at 2' 0" o.c. on all cross tees within ten (10) feet of all entrances

C. Exterior Direct Hung Suspension Systems: provide the following:

1. Armstrong World Industries, Inc.
   a. Prelude XL 15/16-inch corrosion resistant exposed tee grid
   b. Superfine XL 9/16-inch corrosion resistant exposed tee grid
   b. Hold down clips to be installed at all exterior lay-in ceilings at 2' 0" o.c.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers: Subject to compliance with requirements, provide products by the following

1. Armstrong World Industries, Inc.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips and complying with seismic design requirements and the following:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221M for Alloy and Temper 6063-T5.
2. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils (0.04 mm). Comply with ASTM C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.7 ACOUSTICAL SEALANT

A. Products: Subject to compliance with requirements, provide one of the following, but are not limited to, the following:

1. Acoustical Sealant for Exposed and Concealed Joints:
   a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
2. Acoustical Sealant for Concealed Joints:
   a. Pecora Corporation; AIS-919.
   b. Tremco, Inc.; Tremco Acoustical Sealant.

B. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.

2.8 WOOD GRAIN ACOUSTICAL WALL AND CEILING PANELS: WD-1 and WD-2

A. Manufacturer: MPS Acoustic:1-866-557-8438, or 210-580-5886

B. Style: WANDER Felt Wall and Ceiling Panels by MPS Acoustics. WD-1
1. Acoustical Panels – Wall and Ceiling systems:
2. Material: PET felt, 100% polyester fiber, 60% recycled content.
3. Configuration: Vertical Wall Panel, 42 x 119 inches
4. Thickness: 3/8 inch
5. Noise Reduction Coefficient (0.32 NRC)and (0.82 NRC)
6. Color and Pattern: Wood Grain, as selected from manufacture’s full range of options
7. Flame Spread: ASTM E 84; Class A
8. VOC: ASTM D5116 Compliant
9. Mounting: as recommended by Manufacture, MPS Acoustics, Toll Free 866-557-8438, www.mpsacoustics.com.

C. Style: COLIGO Felt Wall Covering by MPS Acoustics.: WD-2
   1. Material: PET felt, 100% polyester fiber, 60% recycled content.
   2. Size: 46 x 119 inches
   3. Thickness: 3/8 inch
   4. Seams: Beveled
   5. Noise Reduction Coefficient (0.32 NRC)and (0.82 NRC)
   6. Color and Pattern : Wood Grain , color to be selected from manufactures standard colors
   7. Flame Spread: ASTM E 84; Class A
   8. VOC: ASTM D5116 Compliant
   9. Mounting: as recommended by Manufacture, MPS Acoustics, Toll Free 866-557-8438, www.mpsacoustics.com.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

   1. Install hangers' plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches (305 mm) o.c.

F. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.

3.4 CLEANING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE 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. Resilient base.
2. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than twelve (12) inches (300 mm) long, of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 Degrees F (10 Degrees C) or more than 90 Degrees F (32 Degrees C).

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 Degrees F (21 Degrees C) or more than 95 Degrees F (35 Degrees C), in spaces to receive resilient products during the following time periods:

1. Forty-eight (48) hours before installation.
2. During installation.
3. Forty-eight (48) hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 Degrees F (13 Degrees C) or more than 95 Degrees F (35 Degrees C).

C. Install resilient products after other finishing operations, including painting, have been completed.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than ten (10) linear feet (3 linear m) for every five hundred (500) linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 Rubber Base

A. Rubber Base:

a. Refer to Room Finish Legend for vendor, style and color.

b. Refer to Room Finish Schedule for location.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (Thermoset Vulcanized Rubber).
2. Manufacturing Method: Group I (solid).
3. Style: Cove (base with toe) as scheduled
4. Style: Straight (No Toe) as scheduled

C. Minimum Thickness: 0.125 inch (3.2 mm).

D. Height: 4 inches (102 mm).

E. Lengths: 120 foot coil in manufacturer's standard length.

F. Contains 10% natural rubber.

G. Outside Corners: Preformed by installer on Site.

H. Inside Corners: Preformed by installer on Site.

I. Colors and Patterns: As indicated on Architectural Room Finish Legend.

J. Product must meet the testing requirements of the California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. Cove Base Adhesives: Not more than 50 g/L

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 097720 - FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard.
   1. PVC trim.

B. Products Not Furnished or Installed under This Section:
   1. Gypsum substrate board.
   2. Resilient Base.

1.2 RELATED SECTIONS

A. Section 092900 - Gypsum Board: substrate board.

B. Section 099123 - Interior Painting: Painting and Transparent Finishes.

C. Section 096519 - Resilient Tile Flooring: Base.

1.3 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM)
   1. ASTM D 256 - Izod Impact Strengths (ft #/in)
   2. ASTM D 570 - Water Absorption (%)
   3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi)
   4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi)
   5. ASTM D 2583- Barcol Hardness
   6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.

C. Selection Samples: Submit manufacturer’s standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
   1. Submit complete with specified applied finish.
   2. For selected patterns show complete pattern repeat.

3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives and sealants prior to their delivery to the site.

1.5 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
1. ASTM E 84 (Method of test for surface burning characteristics of building Materials)
a. Wall Required Rating – Class A.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (70°) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) and ventilation consistent with good working conditions for finish work.

B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.8 WARRANTY

A. Furnish one (1) year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite.

B. Product:
1. Standard FRP.

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
1. Coating: Multi layer print, primer and finish coats.
2. Dimensions:
a. Thickness - 0.090 inch (2.29mm) nominal.
b. Width - 4'-0” (1.22m) nominal
c. Length: As indicated on the drawings nominal

3. Tolerance:
a. Length and Width: +/-1/8 inch (3.175mm)
b. Square - Not to exceed 1/8 inch for 8-foot (2.4m) panels or 5/32-inch (3.96mm) for 10-foot (2.4m) panels.

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   1. Flexural Strength - 1.0 x 10^4 psi per ASTM D 790. (7.0 kilogram-force/square millimeter)
   2. Flexural Modulus - 3.1 x 10^5 psi per ASTM D 790. (217.9 kilogram-force/square millimeter)
   3. Tensile Strength - 7.0 x 10^3 psi per ASTM D 638. (4.9 kilogram-force/square millimeter)
   4. Tensile Modulus - 1.6 x 10^5 psi per ASTM D 638. (112.5 kilogram-force/square millimeter)
   5. Water Absorption - 0.72% per ASTM D 570.
   6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
   7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Finish: White
   1. Color: P199 Bright White
      a. Fire Rating Class A (I)
      b. Size: as indicated on drawings

2.3 MOLDINGS

A. PVC: Extruded PVC Trim Profiles for .090-inch-thick panels.
   1. M 350 Inside Corner
   2. M 360 Outside Corner
   3. M 365 Division
   4. M 370 Edge

   5. Color: P118 Natural Almond

2.4 ACCESSORIES

A. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.

   2. Length to suit project conditions.

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
   1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive

   2. Marlite C-375 Construction adhesive flexible, water-resistant, solvent based adhesive formulated for fast, easy application.

C. Sealant:
   1. Marlite Brand MS-250 Clear Silicone Sealant
   2. Marlite Brand MS-251 White Silicone Sealant
   3. Marlite Brand - Color Match Sealant.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
   1. Verify that stud spacing does not exceed 24 inch (61cm) on-center.

B. Repair defects prior to installation.

   1. Level wall surfaces to panel manufacturer’s requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8” inch (3 mm) clearance for every 8 foot (2.43m) of panel.
   1. Cut and drill with carbide tipped saw blades or drill bits.
   2. Pre-drill fastener holes 1/8-inch (3.175mm) oversize with high speed drill bit.
      a. Space at 8 inches (20.32cm) maximum on center at perimeter, approximately 1 inch from panel edge.
      b. Space at in field in rows 16 inches (40.64cm) on center, with fasteners spaced at 12 inches (30.48 cm) maximum on center.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
   1. Install panels with manufacturers’ recommended gap for panel field and corner joints.
      a. Adhesive trowel and application method to conform to adhesive manufacturer’s recommendations.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
   1. All moldings must provide for a minimum 1/8 inch (3.18mm) of panel expansion at joints and edges, to insure proper installation.
   2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations Do not use abrasive cleaners.

END OF SECTION 097720

SECTION 099113 - EXTERIOR PAINTING

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 surface preparation and the application of paint systems on the following but limited to listed exterior substrates:

1. Concrete.
2. Steel.
3. Galvanized metal.
4. Aluminum (not anodized or otherwise coated).
5. Wood.
6. Exterior portland cement plaster (stucco).
7. Exterior Insulating Finish System (EIFS) Top Coat.

B. Related Requirements:
1. Section 013300 - Submittal Requirements
2. Division 05 – Metals: Sections for shop priming of metal substrates with primers specified in this Section.
3. Division 06 – Wood, Plastics, and Composites; Sections for shop priming carpentry with primers specified in this Section.
4. Division 08 – Openings; Sections for factory priming windows and doors with primers specified in this Section.
5. Division 09 – Finishes; painting Sections for special-use coatings.
6. Section 099123 - Interior Painting: For surface preparation and the application of paint systems on interior substrates.
7. Division 09 – Openings; "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

DEFINITIONS

C. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

F. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

H. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5% percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

    a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 55 deg F (13 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 55 and 95 deg F (13 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following
1. Benjamin Moore & Co.
2. ICI Paints.
3. Kelly-Moore Paints.
4. Kwal Paint.
5. Parex LaHabra Inc.
6. PPG Architectural Finishes, Inc.
7. Pratt & Lambert.
8. Sherwin-Williams Company (The).
9. PPG Amercoat Industrial Coatings
10. Zinsser.
11. Thoro Systems

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List.". The products listed below are from Sherwin Williams and Thoro Systems provided as a quality standard reference.

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for exterior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and SCAQMD Rule # 1113 as amended June 3, 2011.

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 50 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust Preventative Coatings: 100 g/L
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Floor Coatings: 50 g/L.
9. Shellacs, Clear: 730 g/L.
10. Shellacs, Pigmented: 550 g/L.
11. Industrial Maintenance Coatings (IMC): 100 g/L
12. Varnishes: 275 g/L
13. Stains: 250 g/L
14. Wood Preservatives: 350 g/L
15. Waterproofing Concrete/Masonry Sealers: 100g/L

D. Colors: Match Architect's samples and as indicated in a color schedule

1. 10% percent of surface area will be painted with deep tones.

2.3 PRIMERS/SEALERS

A. Primer, Alkali Resistant, Water Based: MPI #3.

1. Thoro Systems: Thoro Primer 1000. VOC: 55 g/L

2. Sherwin Williams: Loxon Concrete & Masonry Primer. VOC 96 g/L

B. Primer, Bonding, Water Based:MPI #17.

1. Sherwin Williams: Adhesion Primer B51W8050. VOC: 44 g/L

2.4 METAL PRIMERS

A. Primer, Steel, Aluminum Galvanized, Water Based:MPI#107.

1. Sherwin Williams: ProCryl Universal Primer B66W00310. VOC <100g/L

B. Primer, Steel, Aluminum Galvanized, Epoxy Based:MPI#108.

1. Amercoat 68HS VOC Zinc Rich Epoxy. VOC: <100 g/L

2.5 WOOD PRIMERS

A. Primer, Latex for Exterior Wood:MPI#6.

1. Sherwin Williams: Exterior Latex Wood Primer B42W8041. VOC 86 g/L

2.6 WATER-BASED PAINTS

A. Latex, Exterior Semi-Gloss (Gloss Level 5):MPI#11.

1. Sherwin Williams: A100 Exterior Gloss Latex A8W16 or A08W00151 VOC: 47 g/L

B. Light Industrial Coating, Exterior, Water Based, Gloss (Gloss Level 6):MPI #164.

1. Sherwin Williams: ProIndustrial Zero VOC Enamel B66-600 Gloss. VOC: Zero g/L

C. Latex, Exterior Flat (Gloss Level 1):MPI #10.

1. Sherwin Williams: Loxon Acrylic Coating A24W300. VOC: 46 g/L

2.7 SOLVENT BASED HIGH BUILD COATINGS

A. Hybrid Polysiloxane Top coat

1. PPG Amercoat Hybrid Siloxane. VOC: < 84.0

2.8 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. The contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to the Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. The testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. The contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Wood: 15 percent.
3. Portland Cement Plaster: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 3, "Power Tool Cleaning."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

   1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
   2. Sand surfaces that will be exposed to view, and dust off.
   3. Prime edges, ends, faces, undersides, and backsides of wood.
   4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards and switch gear.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.
h. Piping, bollards, structural steel, steel fence columns.
i. Piping, conduit, or equipment on roof top that is not factory finished.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. The contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At the end of each workday, remove rubbish, empty cans, rags, and other discarded materials from the Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces: Textured and High Build

1. Latex Aggregate /Latex System:
   a. Prime Coat: Thoro System Thoro Primer 1000, alkali resistant, water based. VOC 55 g/L**,**
   b. Intermediate Coat: Thoro Systems Thorolastic, exterior, matching topcoat. VOC 50 g/L
   c. Topcoat: Thoro Systems Thorolastic in texture as selected by architect. VOC 50 g/L

B. Steel Substrates

1. Water-Based Light Industrial Coating System:
   a. Prime Coat: Shop primer compatible with topcoats or light industrial coating, exterior, water based
      Sherwin Williams: ProCryl Universal Primer B66W00310.VOC: <100 g/L
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      Sherwin Williams: ProIndustrial Zero VOC Enamel B66-600 VOC: Zero g/L
   c. Topcoat: Light industrial coating, exterior, water based, gloss (Gloss Level 6)**,**MPI#164.
      Sherwin Williams: ProIndustrial Enamel B66-600 VOC: Zero g/L

C. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System:
   a. Prime Coat: Shop primer compatible with topcoats or light industrial coating, exterior, water based
      Sherwin Williams: ProCryl Universal Primer B66W00310.VOC: <100 g/L
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      Sherwin Williams: ProIndustrial Zero VOC Enamel B66-600 VOC: Zero g/L
   c. Topcoat: Light industrial coating, exterior, water based, gloss (Gloss Level 6)**,**MPI#164.
      Sherwin Williams: ProIndustrial Zero VOC Enamel B66-600 VOC :Zero g/L.

D. Aluminum Substrates:

1. Water-Based Light Industrial Coating System:
   a. Prime Coat: Shop primer compatible with topcoats or light industrial coating, exterior, water based
      Sherwin Williams: ProCryl Universal Primer B66W00310.VOC: <100 g/L
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      Sherwin Williams: ProIndustrial Zero VOC B66-600 VOC: Zero g/L
   c. Topcoat: Light industrial coating, exterior, water based, gloss (Gloss Level 6)**,**MPI#164.
      Sherwin Williams: ProIndustrial Zero VOC Enamel B66-600 VOC: Zero g/L.

E. Wood Substrates: Including wood trim, wood siding, wood fences, other exposed wood

1. Latex System:
   a. Prime Coat: Primer, latex for exterior wood**,**MPI#6.
      Sherwin Williams: Exterior Latex Wood Primer B42W8041.VOC: 86 g/L
   b. Intermediate Coat: Latex, exterior, matching topcoat.
      Sherwin Williams: A100 Exterior Gloss Latex A8W16 or A08W00151.
      VOC: 47 g/L
   c. Topcoat: Latex, exterior semi-gloss (Gloss Level 5)**,**MPI #11.
      Sherwin Williams: A100 Exterior Gloss Latex A8W16 or A08W00151.
      VOC 47 g/L

F. Portland Cement Plaster Substrates: Vertical or Horizontal surfaces

1. Latex System:
   a. Prime Coat: Primer, alkali resistant, water based**,** MPI#38.
      Thoro Systems: Thoro Primer 1000. VOC: 55 g/L
   b. Intermediate Coat: Latex, exterior, matching topcoat.
      Thoro Systems: Thorolastic 100% Acrylic Elastomeric Coating in texture as selected by Architect. VOC: 50 g/L
   c. Topcoat: Latex, exterior flat (Gloss Level 1)**,** MPI#10.
      Thoro Systems: Thorolastic 100% Acrylic Elastomeric Coating in texture as selected by Architect. VOC: 50 g/L

G. Exterior Insulating Finish System (EIFS): Textured and High Build (Vertical Surfaces)

1. Latex Aggregate /Latex System:
   a. Prime Coat: Not required or as recommended in writing by topcoat manufacturer VOC <50 g/L
   b. Intermediate Coat: Latex, exterior, matching topcoat.
      Thoro Systems: Thorolastic 100% Acrylic Elastomeric Coating in texture as selected by Architect. VOC: 50 g/L.

   c. Topcoat: Latex, exterior flat (Gloss Level 1)**,** MPI#10.
      Thoro Systems: Thorolastic 100% Acrylic Elastomeric Coating in texture as selected by Architect. VOC: 50 g/L

H. Special Handrail Paints and Corrosion Resistant Coating.

1. Shop Primer for Bare Steel fabricator applied prime coat over SSPC-SP6 “Commercial Blast Cleaning” prepared surface: Zinc Rich Epoxy, High Build, Low VOC Primer: and compatible Polysiloxane topcoat.
   a. Zinc Rich Epoxy Primer Coat: compatible with topcoat.
      Amercoat 68HS VOC Zinc Rich Epoxy Primer. VOC: <84 g/L
   b. Hybrid Polysiloxane Top coat
      Amercoat PSX 700 Polysiloxane VOC: < 84 g/L

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

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 surface preparation and the application of paint systems on interior substrates including, but not limited to the following interior substrates:

1. Concrete.
2. Concrete masonry units (CMU).
3. Steel.
4. Cast iron.
5. Galvanized metal.
6. Aluminum (not anodized or otherwise coated).
7. Wood.
8. Gypsum board.
9. EIFS and Plaster.

B. Related Requirements:

1. Section 013300 - Submittal Requirements
2. Division 05 – Metals; Sections for shop priming of metal substrates with primers specified in this Section.
3. Division 06 – Wood, Plastics, and Composites; Sections for shop priming carpentry with primers specified in this Section.
4. Division 08 – Openings; Sections for factory priming windows and doors with primers specified in this Section.
5. Division 09 – Finishes; painting Sections for high-performance and special-use coatings.
6. Division 09 – Finishes; Section "Exterior Painting" for surface preparation and the application of paint systems on exterior substrates.
7. Division 09 – Finishes; Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960. Provide low VOC products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
1. Benjamin Moore & Co.
2. ICI Paints.
3. Kwal Paint.

4. L & M Construction Chemicals
5. PPG Architectural Finishes, Inc.
6. Sherwin-Williams Company .
7. Zinsser.
8. Thoro.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated. Product comparison is based on products of the Sherwin Williams Company and approved products per MPI as noted below.
   1. Paints and primers: Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.
      a. Interior paint: Comply with GS-11.
      b. Exterior paint: Comply with GS-11.
   2. Specialty Coatings:
      a. Radiation Control Coatings: Minimum solar reflectance of cured coating 0.8 and minimum ambient temperature total hemispherical emittance of cured coating at least 0.08 in accordance with ASTM C1483.
      b. Anti-Corrosive Paint: Comply with GS-11.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and SCAQMD Rule # 1113 as amended June 3, 2011.

   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 50 g/L.
   3. Dry-Fog Coatings: 50 g/L.
   4. Primers, Sealers, and Undercoaters: 100 g/L.
   5. Rust Preventative Coatings: 100 g/L
   6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
   7. Pretreatment Wash Primers: 420 g/L.
   8. Floor Coatings: 50 g/L.
   9. Shellacs, Clear: 730 g/L.
   10. Shellacs, Pigmented: 550 g/L.

11. Industrial Maintenance Coatings (IMC): 100 g/L
12. Varnishes: 275 g/L
13. Stains: 250 g/L

D. Colors: As selected by Architect from manufacturer's full range to match color schedule indicated in the drawings.

1. Ten (10) percent of surface area will be painted with deep tones.

2.3 SCHEDULE

A. CONCRETE - (Walls & Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place) including PLASTER - (Walls, Ceilings)
1. Latex Systems
a. Eg-Shell Finish
1st Coat: S-W PrepRite® Masonry Primer, B28W300 (7 mils wet, 3 mils dry). VOC:89 g/L
2nd Coat: S-W ProMar 200 Zero VOC Eg-shell, B20-2600 Series
3rd Coat: S-W ProMar 200 Zero VOC Eg-shell, B26-2600 Series (4 mils wet, 1.7 mils dry per coat). VOC: 0 g/L

B. MASONRY - (CMU - Concrete, Split Face, Scored, Smooth, High Density, Low Density, Fluted)
1. Latex Systems
a. Eg-Shell Finish
1st Coat: S-W PrepRite Block Filler, B25W25 (16 mils wet, 8 mils dry) VOC: 45 g/L
2nd Coat: S-W ProMar 200 Zero VOC Eg-shell, B26-2600 Series
3rd Coat: S-W ProMar 200 Zero VOC Eg-shell, B26-2600 Series (4 mils wet, 1.7 mils dry per coat). VOC: 0 g/L

C. METAL - (Aluminum, Galvanized)
1. Latex Systems
a. Semi-Gloss Finish
1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry). VOC: <100 g/L
2nd Coat: S-W Pro Industrial Zero VOC Semi-Gloss Acrylic, B66-650 Series. VOC: 0 g/L
3rd Coat: S-W Pro Industrial Zero VOC Semi-Gloss Acrylic, B66-650 Series (2.5-4 mils dry per coat). 0 g/L

D. METAL - (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Structural Iron, Ferrous Metal)
1. Latex Systems
a. Semi-Gloss Finish
1st Coat:S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry). VOC < 100 g/L
2nd Coat: S-W ProGreen 200 Semi-Gloss, B31-600 Series
3rd Coat: S-W ProGreen 200 Semi-Gloss, B31-600 Series (4 mils wet, 1.6 mils dry per coat). VOC: 49 g/L

E. WOOD - (Walls, Ceilings, Doors, Trim,)

1. Latex Systems

a. Semi - Gloss Finish

1st Coat:	S-W PrepRite® ProBlock® Latex Primer, B51 Series (4 mils wet, 1.4 mils dry). VOC 96 g/L
2nd Coat:	S-W ProGreen 200 Semi-Gloss, B31-600 Series
3rd Coat:	S-W ProGreen 200 Semi-Gloss, B31-600 Series (4 mils wet, 1.6 mils dry per coat). VOC: 49 g/L

2. Stain and Varnish System

a. Satin Finish

1st Coat:	S-W Minwax 250 VOC Stains. VOC <250 g/L
2nd Coat:	S-W Minwax Polyacrylic Protective Finish. VOC<275g/L
3rd Coat:	-W Minwax Polyacrylic Protective Finish. VOC<275g/L

F. DRYWALL - (Walls, Ceilings, Gypsum Board, etc.)

1. Latex Systems

a. Eg-Shell Finish

1st Coat:	S-W ProGreen 200 Interior Latex Primer, B28W600 (4 mils wet, 1.5 mils dry per coat). VOC 43 g/L
2nd Coat:	S-W ProMar 200 Zero VOC Eg-shell, B26-2600 Series
3rd Coat:	S-W ProMar 200 Zero VOC Eg-shell, B26-2600 Series (4 mils wet, 1.7 mils dry per coat). VOC: 0 g/L

G. Concrete - (Floors)

1. Latex Systems

a. Satin Finish

1st Coat:	S-W Porch & Floor Enamel A32-200 Series
2nd Coat:	S-W Porch & Floor Enamel A32-200 Series
3rd Coat:	S-W Porch & Floor Enamel A32-200 Series (optional) (1.5 mils dry, per coat). VOC <42 g/L

2.4 MATERIALS - GENERAL REQUIREMENTS

A Paints and Coatings - General:

1.Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such a procedure is specifically described in manufacturer's product instructions. VOC numbers need to be confirmed by using the products MSDS sheets.

2.5 ACCESSORIES

A Coating Application Accessories:

1 Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufactures specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A Do not begin application of coatings until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding.

B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.2 SURFACE PREPARATION

A Proper product selection, surface preparation, and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.

B Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.

C The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.

D Remove mildew before painting by washing with a solution of one (1) part liquid household bleach and three (3) parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes; however, do not allow the solution to dry on the surface. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

E No painting should take place when the interior temperature is below 50°F unless the specified product is designed for the marginal conditions.

F Methods
1. Aluminum
   Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
2. Block (Concrete)
   Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F unless the manufactures products are designed for application prior to the 30-day period. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

3. Concrete, SSPC-SP13 or NACE 6
   This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
4. Cement Composition Siding/Panels
   Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments.
5. Drywall—Interior
   Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
6. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
7. Plaster: Allow to dry thoroughly for at least 30 days before painting unless the manufactures products are designed for application prior to the 30-day period. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1-pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
8. Steel: Structural, Plate, etc.
   Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
9. Solvent Cleaning, SSPC-SP1
   Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
10. Hand Tool Cleaning, SSPC-SP2
    Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1 or other agreed upon methods.
11. Power Tool Cleaning, SSPC-SP3
    Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1 or other agreed upon methods.

12. Commercial Blast Cleaning, SSPC-SP6 or NACE 3
    A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent (33%) of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
13. Power Tool Cleaning to Bare Metal, SSPC-SP11
    Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
14. Water Blasting, NACE Standard RP-01-72
    Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.
15. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

3.3 INSTALLATION

A Apply all coatings and materials with manufacturer specifications in mind. Mix and thin coatings according to manufacturer's recommendation.

B Do not apply to wet or damp surfaces.
1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
2 Test new concrete for moisture content.

C Apply coatings using methods recommended by manufacturer.

D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

E Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.

F Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to each coat.

3.4 PROTECTION

A Protect finished coatings from damage until completion of project.

B Touch-up damaged coatings after substantial completion, following manufacture's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

3.5 SITE ENVIRONMENTAL PROCEDURES

A. Indoor Air Quality: Provide temporary ventilation as specified in Section 01 57 19.11 (01352) – Indoor Air Quality (IAQ) Management.

B. Waste Management: As specified in Section 01 74 19 (01351) – Construction Waste Management and as follows:

1. Coordinate with manufacturer. Set aside scrap to be returned to manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

3.6 SCHEDULES

A. See drawings for all finish notes and schedules.

END OF SECTION 099123

SECTION 104413 - FIRE EXTINGUISHER CABINETS, KNOX BOX

PART 1 - GENERAL

1.1 RELATED DOCUMENNT

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. Fire protection cabinets for the following:

a. Portable fire extinguishers.

2. Key box for fire department access

B. Related Sections:
1. Section 013300 - Submittal Requirements
2. Division 10 – Specialties; "Signage" for directional signage to out-of-sight fire extinguishers and cabinets.
3. Division 10 - Fire Extinguishers.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

2. Key Box Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction as approved by local authorities.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Size: 6 by 6 inches (150 by 150 mm) square.

D. Maintenance Data: For fire protection cabinets to be included in maintenance manuals.

1.4 QUALITY ASSURANCE

A Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Key Box: The key box shall be of an approved type listed in accordance with UL 1037 and shall contain keys to gain access as required by the code official.

1. UL 437 Standard for Safety for Key Locks (keyway).
2. UL 1037 Antitheft Alarms and Devices (entire unit).
3. UL 1332 Organic Coatings for Steel Enclosures for Outdoor Use Electrical Equipment.

1.5 COORDINATION

A. Coordinate the size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Stainless-Steel Sheet: ASTM A 666, Type 304.

C. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 1.5 mm thick, with Finish 1 smooth or polished.

2.2 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher with mounting bracket.

1. Products: Subject to compliance with requirements, provide one of the following:
Larsen's Manufacturing Company; SSB-2409-6R-Vertical Duo Door for non-rated walls. SS-FS-B-2409-6R Vertical Duo Door for rated walls

B. Cabinet Construction: Nonrated unless noted otherwise on the Drawings

2. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- (1.1-mm-) thick, cold-rolled steel sheet lined with minimum 5/8-inch- (16-mm-) thick, fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Steel sheet.

D. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
   3. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Stainless-steel sheet

G. Door Style: Vertical duo panel with frame

H. Door Glazing: Acrylic sheet.

   1. Acrylic Sheet Color: Clear transparent acrylic sheet.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

   1. Provide recessed door pull and friction latch.
   2. Provide continuous hinge, of same material and finish as trim permitting door to open 180 degrees.

J. Accessories:

   1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

   2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.

      a. Identify fire extinguisher in fire protection cabinet with the words "**FIRE EXTINGUISHER**."

         1) Location: Applied to cabinet door.
         2) Application Process: Die cut engraved.
         3) Lettering Color: Black.
         4) Orientation: Vertical

K. Finishes:

   1. Manufacturer's standard baked-enamel paint for the following:
      a. Interior of cabinet and door. Color: White
   2. Stainless Steel: No. 4.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch (13 mm) thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STEEL FINISHES

A. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

B. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils (0.05 mm).

1. Color and Gloss: As selected by Architect from manufacturer's full range.

2.6 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.
   2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   3. Directional Satin Finish: No. 4.

2.7 KNOX BOX

A. KNOX-BOX to be recessed mount with hinged door, without UL Listed tamper switches. 1/4" plate steel housing, 1/2" thick steel door with interior gasket seal and stainless steel door hinge. Box and lock UL Listed. Lock has 1/8" thick stainless steel dust cover with tamper seal mounting capability.

   1. Exterior Dimensions:
      a. Recessed mount flange- 7"H x 7"W
      b. Lock: UL Listed. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key.
      c. Finish: Knox-Coat® proprietary finishing process
         1) Colors: Black, Dark Bronze or Aluminum as selected by Architect
      d. Manufacturer:
         1) KNOX Company Model No. 3200

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in cabinets to verify actual locations of piping connections before cabinet installation.

B. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated
   1. Fire Protection Cabinets: 54 inches (1372 mm) above finished floor to top of cabinet.

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

   1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, advise Architect immediately for instructions.

C. Identification: Apply decals at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.5 KNOX BOX INSTALLATION

A. Install Knox Box according manufactures' instructions and NFPA / IFC 506.1 where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life- saving of fire-fighting purposes, the fire code official is authorized to require a key box to be installed in an accessible location.

   1. See plans for location. Verify location with local Fire Department or authorities having jurisdiction.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

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 portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Sections:

1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and

C. Operation and Maintenance Data: For fire extinguishers to be included in maintenance manuals.

D. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
a. J. L. Industries, Inc.; Cosmic 10E
b. Larsen's Manufacturing Company. MP-10

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb (4.5-kg nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. J. L. Industries, Inc.
b. Larsen's Manufacturing Company.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches (1372 mm) above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated. Install brackets inside of fire extinguisher cabinets such that the extinguishers is one (1”) inch above the bottom of the cabinet.

END OF SECTION 104416

SECTION 108000 - TOILET AND SERVICE ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A The Bidding and Contract Requirements and General Requirements apply to this Work.

B. This Section of the Specifications shall comply with Article 7, Article 601b, amended by Article 9102 of the Texas Civil Statutes, The Elimination of Architectural Barriers Act Texas Accessibility Standards (2012) and The Americans with Disabilities Act (ADA) 2010.

1.2 SECTION INCLUDES:

A. The Contractor shall provide all items, articles, materials, operations, methods listed, mentioned, or scheduled on the drawings and/or herein including all labor, equipment, and incidentals necessary and required to complete toilet and service accessories work indicated and specified herein.

B. Furnish and install all of the accessories specified herein complete with installation devices and reinforcements.

1.3 SUBMITTALS:

A. Conform to procedures specified in Section 013300 - Submittal Procedures: 'Shop Drawings, Product Data, Samples and Colors' and the requirements below. Submit product data for each accessory listed.

B. Schedule - Prepare a complete schedule of accessories listed by rooms. Mark each accessory before delivery to correspond with schedule. Show mounting devices and fastenings to be furnished for each type of accessory and each mounting condition.

1.4 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 093000 – Tiling.

1.5 DELIVERY HANDLING AND STORAGE:

A. Protect all Toilet Accessories from damage during delivery and handling. Leave accessories in protective coverings until time for installation. Store inside to provide complete protection from the weather dampness and construction activities. All damaged items shall be replaced at no cost to the owner,

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Products as listed below and as scheduled on the plans:
   1. Bobrick Washroom Equipment, Inc. (Basis of Design)
   2. ASI Bradley

3. Scranton Products- Hiny Hinder Phenolic Toilet Partitions and Urinal screen
4. Substitutions under provisions of Section 016000 - Product Requirements.

2.2 PRODUCTS

A. The manufacturers and products named for specific materials in this paragraph are believed to conform to the criteria stated for that material and to the intended standards of quality, function and appearance.

B. Stainless Steel: When required for items below, use type 304 satin finish.

C. Grab Bars: The bars listed below shall be fabricated to meet the following requirements:

D. Stainless steel tubing, type 304, non-slip finish 18-gauge or heavier, 1 -1/2 inch outside diameter, having concealed type fastening at each support. Designed for l-1/2-inch clearance from adjacent vertical surface. Bars when mounted on the scheduled surface shall be capable of supporting 300-Ib load. Provide fastening and mounting accessories necessary to accomplish this requirement. Bends m bats shall be by the mandrel process to assure uniform diameter at bends. Space intermediate support at 48-inch intervals or less.

E. Scranton Products- Hiny Hinder Phenolic Toilet Partitions and Urinal screens
1. Floor mounted to ceiling.
2. Color: to be selected from full range of manufactures colors.
3. Panel Texture: Orange Peel.

PART 3 EXECUTION

3.1 TOILET ACCESSORY SCHEDULE:

A. Location: Provide accessories as required on the Drawings by indication and/or schedule.

B. Special Requirement: In the absence of definition on the Drawings, locate accessories as directed by the Architect, with the following as the minimum quantity requirements:
   1. Toilet Paper Dispenser Unit - one for each water closet. Mount double sided units on compartment partitions where shown. Position to allow grab bar to pass over without blocking access to dispenser. Mount single units where double units will not work Bobrick B-540
   2. Recessed Towel Dispenser/Receptacle - Mount towel dispenser slot at maximum 48" above floor, comply with handicap requirements. Bobrick - 8-4369.
   3. Grab Bar - Two in each wheelchair accessible toilet compartment. (1 each-36" and 1 each 48"). Bobrick 8-6806-36., Bobrick 8-6806-48

C. Procedure: Fasten each accessory rigidly in place, in perfect plumb, level and in alignment. Where an accessory mounted on or on a surface having a joint pattern, mount symmetrically within the pattern wherever possible. In toilet compartments wherever possible mount the accessories back-to-back.

D. Special Requirement: Mount grab bars with devices and fastenings as required by mounting condition to develop a capacity to resist downward pull of at least three hundred (300) lbs.
   1. All accessories shall be mounted so as not to interfere with the full swing of compartment doors or grab bars.

END OF SECTION 108000

SECTION 092900 - GYPSUM BOARD

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. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

B. Related Requirements:

1. Division 06 - Wood, Plastics, and Composites.
2. Division 09 - Finishes.

1.3 ACTION SUBMITTALS

A. Documentation to be provided with completed Materials Documentation Submittal Sheet for each material; refer to Section 013300 – Submittal Procedures.

B. Submit product data sheets, installation instructions, environmental data and controls or products provided under work of this Section.

C. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
2. Textured Finishes: 4 x 4 foot (122 cm x 122 cm) panel for each textured finish indicated and on same backing indicated for Work for initial selection.

1.4 QUALITY ASSURANCE

A. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE 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 E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. All gypsum board products must be mined and produced within the continental United States and be manufactured for domestic use.

B. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than fifty percent (50%).

C. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with the support system indicated.

D. Gypsum Board:

1. Recycled Content: Minimum 10 percent post-consumer recycled content, or minimum 20 percent pre-consumer recycled content at contractor's option.

E. Manufacturer Locations: Gypsum Board products shall be manufactured in Texas in the greatest quantities feasible.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. National Gypsum Company.
5. Temple-Inland.
6. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered

C. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch (6.4 mm).
2. Long Edges: Tapered.

D. Reinforced Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

2.4 SPECIALTY GYPSUM BOARD

A. Glass-Mat Interior Gypsum Board: ASTM C 1658/C 1658M. With fiberglass mat laminated to both sides. Specifically designed for interior use.

1. Products: Subject to compliance with requirements,provide one of the following:

    a. Georgia-Pacific Gypsum LLC; DensArmour Plus.
    b. Temple Inland Green Glass.
2. Core: 5/8 inch (15.9 mm), Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10.

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide the following:
    a. National Gypsum Company, Permabase Cement Board.

2. Thickness: 5/8 inch (15.9 mm).
3. Mold Resistance: ASTM D 3273, score of 10.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc
2. Shapes:

    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. L-Bead: L-shaped; exposed long flange receives joint compound.
    e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    f. Expansion (control) joint.
    g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
2. Shapes:

    a. Cornerbead.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by the following

   a. Fry Reglet Corp.
   b. Gordon, Inc.
   c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 , Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified .

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.
5. Reinforcing Tape: Toxicity / TEQ: Sheetrock Joint Tape. Paper; fibErglass joint tape not permitted.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
   a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use setting-type, sandable topping or drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish in lobby areas as indicated in the finish schedule on plans.
6. Joint-Treatment Materials: Toxicity/IEQ: Lime compound. All purpose joint and texturing compound containing inert fillers and natural binders. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides and other slow releasing compounds.

D. Joint Compound for Exterior Applications:
   1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels:
   1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.8 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

   1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly. In no assembly shall the fire developed exceed 25 or smoke develop exceed 50.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

   1. Products: Subject to compliance with requirements,provide one of the following:
      a. Pecora Corporation; AC-20 FTR.
      b. USG Corporation; SHEETROCK Acoustical Sealant.

   2. Acoustical joint sealant shall have a VOC content of 250> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

G. Vapor Retarder: As specified in Division 07 Section "Thermal Insulation."

2.9 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Texture: Roller applied light orange peel.

1. Level 5 in lobby areas and at radius feature and noted on plans

2. Level 4 at all other locations

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces above ceilings, etc., except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.

2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings and where required for fire-resistance-rated assembly.
3. Flexible Type: As indicated on Drawings. Apply in double layer at curved assemblies.
4. Ceiling Type: As indicated on Drawings.
5. Glass-Mat Interior Type: As indicated on Drawings.
6. Acoustically Enhanced Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners if required for finishes.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

F. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus twelve (12)-inch- (300-mm-) long straight sections at ends of curves and tangent to them.

G. For double-layer construction, fasten base layer to studs with screws sixteen (16) inches (400 mm) o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced twelve (12) inches (300 mm) o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings or according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use[at exposed panel edges.
6. Curved-Edge Cornerbead: Use at curved openings.

D. Exterior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

E. Aluminum Trim: Install in locations indicated on Drawings.

1. FreyReget
   a. DRM 625 375
   b. DRM 625 50

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints**,** rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile or where indicated on Drawings.
3. Level 3 is suitable for surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 4: At all panel surfaces that will be exposed to view unless otherwise indicated.

   a. Primer and its application to surfaces are specified in other Division 09 Sections.

5. Level 5: Where indicated on Drawings.

   a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.

F. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

G. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Apply finish using rollers, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and 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.

END OF SECTION 092900