PROJECT MANUAL

CWA Project No. 2022-08

DCM No. 2023820

PROJECT NAME:
IRONDALE PUBLIC LIBRARY

PROJECT ADDRESS

1032 GRANTS MILL ROAD
IRONDALE, AL 35210

A PROJECT FOR THE CITY OF IRONDALE

DATE ISSUED: NOVEMBER 16, 2023

STATE OF ALABAMA
CHARLES E. WILLIAMS
NO. 2925
REGISTERED ARCHITECTS

VOLUME 1 OF 2

SET NO. _____

Charles Williams
& Associates, Inc
ARCHITECTS

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Charles Williams & Associates, Inc.
3601 8th Avenue South
Birmingham, AL 35222

SECTION 00 01 05

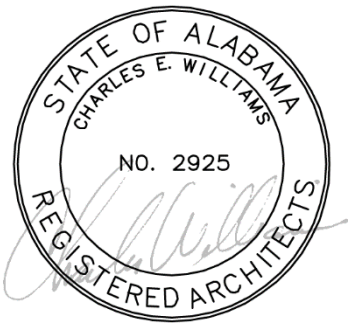
PROJECT DIRECTORY

OWNER:	**CITY OF IRONDALE** 101 20th Street South Irondale, AL 35210 Phone: xxx.xxx.xxxx **James Stewart, Mayor** **Del Wilson, Library Director**
ARCHITECTS:	**CHARLES WILLIAMS & ASSOCIATES** 3601 8th Ave., S. Birmingham, Alabama 35222 Phone: 205.250.0700 **Charles E. Williams, AIA, Principal** **Christa Vandiver, Project Architect**
INTERIORS:	**JILL HICKS DESIGN, LLC** Phone: 205.871.0484 **Jill Hicks, Interior Designer**
CIVIL ENGINEER:	**SARCOR** 215 19th Street North, Suite 101 Birmingham, AL 35203 Phone: 205.706.8170 **Jeff Havercroft, P.E., Civil Engineer**
LANDSCAPE ARCHITECT:	**RENTA URBAN LAND DESIGN** 3325 Rocky Ridge Plaza, Suite 227 Birmingham, AL 35243 Phone: 205.545.7639 **Jim Hogan, Landscape Architect**
STRUCTURAL:	**MBA ENGINEERS, INC.** 300 20th Street North, Suite 100 Birmingham, AL 35203 **Keith Owens, P.E., Structural Engineer**
MECHANICAL, PLUMBING & FIRE PROTECTION:	**DEWBERRY ENGINEERING** 2 Riverchase Office Plaza, Suite 205 Birmingham, AL 35244 Phone: 205.988.2069 **Adam Cone, P.E., Mechanical** **Jacob Cicero, P.E.,Plumbing**

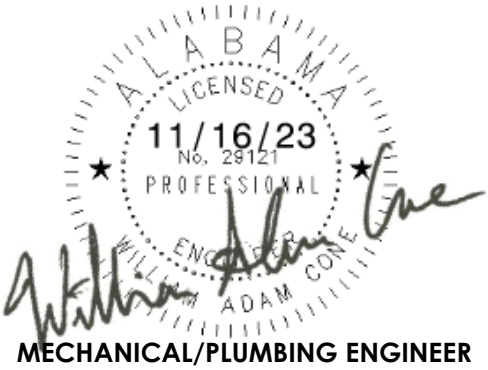
ELECTRICAL: **CCE ELECTRICAL ENGINEERING & DESIGN CONSULTANTS**
1028 23rd Street North
Birmingham, AL 35205
Phone: 205.352.2500
O. Wade Parker, PE, Electrical Engineer

END OF SECTION 00 01 05

ENGINEER/ ARCHITECT PROFESSIONAL REGISTRATION STAMPS



ARCHITECT OF RECORD
CHARLES E. WILLIAMS



MECHANICAL/PLUMBING ENGINEER
WILLIAM ADAM CONE

STRUCTURAL ENGINEER
KEITH L. OWENS

ELECTRICAL ENGINEER
JAMIE L. BAILEY

CIVIL ENGINEER
JEFFREY V. HAVERCROFT

LANDSCAPE ARCHITECT
ANTHONY LEE RENTA

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TABLE OF CONTENTS FOR PROJECT MANUAL

VOLUME 1 OF 2

DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 05	PROJECT DIRECTORY
00 01 07	ARCHITECT/ ENGINEERS SEALS PAGE
00 01 10	TABLE OF CONTENTS
00 11 13	ADVERTISEMENT TO BID
00 21 13	INSTRUCTIONS TO BIDDERS
00 42 13	PROPOSAL FORM
00 42 13a	ATTACHMENT A TO PROPOSAL FORM (SALES TAX)
00 43 12	FORM OF ADVERTISEMENT FOR COMPLETION
00 43 13	SALES TAX EXEMPTION APPLICATION FORMS
00 43 14	STORED MATERIALS LOG
00 43 80	PARTIAL RELEASE OF LIEN
00 60 00	PROJECT FORMS
00 65 19	WAIVER OF LIEN
00 72 13	GENERAL CONDITIONS
00 73 00	SUPPLEMENTAL GENERAL CONDITIONS
00 73 16	CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE
00 74 20	AL VENDOR DISCLOSURE STATEMENT
00 80 01	EVERIFY SAMPLE

DIVISION 1 – GENERAL REQUIREMENTS

01 11 00	SUMMARY OF WORK
01 21 00	ALLOWANCES
01 22 00	UNIT PRICES
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 26 20	WEATHER DELAYS
01 31 00	PROJECT MANAGEMENT AND COORDINATION
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 33 00	SUBMITTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 41 00	STRUCTURAL TEST AND SPECIAL INSPECTIONS
01 42 00	REFERENCES
01 42 19	REFERENCE STANDARDS

01 50 00 TEMPORARY FACILITIES AND CONTROLS
01 60 00 PRODUCT REQUIREMENTS
01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS
01 73 29 CUTTING AND PATCHING
01 77 00 CLOSEOUT PROCEDURES
01 78 23 OPERATION AND MAINTENANCE DATA
01 78 39 PROJECT RECORD DOCUMENTS
01 79 00 DEMONSTRATION AND TRAINING
01 91 13 GENERAL COMMISSIONING REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

02 32 00 GEOTECHNICAL INVESTIGATION
02 41 13 SELECTIVE SITE DEMOLITION

DIVISION 03 – CONCRETE

03 30 00 CAST-IN-PLACE CONCRETE
03 45 00 ARCHITECTURAL PRECAST CONCRETE

DIVISION 04 – MASONRY

04 21 13.13 BRICK VENEER MASONRY
04 43 13 STONE MASONRY VENEER
04 72 00 CAST STONE MASONRY

DIVISION 05 – METALS

05 12 00 STRUCTURAL STEEL
05 22 00 STEEL JOIST
05 31 00 STEEL DECK
05 40 00 COLD FORMED METAL FRAMING
05 50 00 METAL FABRICATIONS

DIVISION0 06 – WOOD AND PLASTIC

06 10 00 ROUGH CARPENTRY
06 20 00 FINISH CARPENTRY
06 41 16 PLASTIC LAMINATE-FACED ARCHITECTURAL CABINETS

DIVISION 07 – THERMAL MOISTURE PROTECTION

07 21 00 THERMAL INSULATION
07 21 13 BOARD INSULATION
07 24 13 POLYMER-BASED EXTERIOR INSULATION AND FINISH SYSTEMS
07 27 27 SELF-ADHERED SHEET AIR BARRIER
07 41 13 METAL ROOF PANELS
07 42 93 ALUMINUM SOFFIT AND FASCIA SYSTEM
07 46 19 STEEL SOFFITS AND SIDING
07 54 19 POLYVINYL-CHLORIDE ROOFING
07 56 00 COLD LIQUID-APPLIED FLASHINGS
07 62 00 SHEET METAL FLASHING AND TRIM
07 71 00 ROOF SPECIALTIES
07 80 00 FIRE AND SMOKE PROTECTION
07 90 00 JOINT PROTECTION

DIVISION 08 – DOORS AND WINDOWS

08 11 13 HOLLOW METAL DOORS AND FRAMES
08 11 16 ALUMINUM DOORS AND FRAMES
08 14 23 CLAD WOOD DOORS
08 31 13 ACCESS DOORS AND FRAMES
08 43 13 ALUMINUM-FRAMED STOREFRONTS
08 44 13 GLAZED ALUMINUM CURTAIN WALLS
08 71 00 DOOR HARDWARE
08 71 13 AUTOMATIC DOOR OPERATORS
08 80 00 GLAZING
08 90 00 LOUVERS AND VENTS

DIVISION 09 – FINISHES

09 21 16 GYPSUM BOARD ASSEMBLIES
09 30 13 CERAMIC TILING
09 51 00 ACOUSTICAL CEILINGS
09 65 13 RESILIENT BASE
09 65 19 RESILIENT TILE FLOORING
09 68 13 TILE CARPETING
09 72 00 WALLCOVERINGS
09 90 00 PAINTS AND COATINGS

DIVISION 10 – SPECIALTIES

10 14 00 SIGNAGE
10 21 13.15 STAINLESS STEEL TOILET COMPARTMENTS
10 26 00 WALL AND CORNER GUARDS
10 28 00 TOILET BATH AND LAUNDRY ACCESSORIES
10 44 16 FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES
10 73 16 CANOPIES

DIVISION 11 – EQUIPMENT

11 52 13 PROJECTION SCREENS AND PROJECTORS

DIVISION 12 – FURNISHINGS

12 24 13 ROLLER WINDOW SHADES
12 36 23.13 PLASTIC-LAMINATE-CLAD COUNTERTOPS
12 36 61.16 SOLID SURFACING COUNTERTOPS
12 36 61.19 QUARTZ SURFACING COUNTERTOPS

VOLUME 2 OF 2

DIVISION 22 – PLUMBING

22 04 05 PLUMBING IDENTIFICATION
22 04 10 GENERAL PROVISIONS - PLUMBING
22 04 20 TESTING, CLEANING AND ADJUSTING (TCA)
22 04 50 MATERIALS & METHODS - PLUMBING
22 04 51 GENERAL FIRE PROTECTION REQUIREMENTS
22 04 53 BASIC FIRE PROTECTION MATERIAL AND METHODS
22 04 55 FIRE PROTECTION SYSTEM
22 04 80 INSULATION - PLUMBING
22 04 90 FIXTURES AND EQUIPMENT – PLUMBING

DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING

23 05 00 GENERAL PROVISIONS
23 05 13 MATERIALS AND METHODS – HVAC
23 05 52 PIPING SPECIALTIES – HVAC

23 05 93 TESTING, ADJUSTING, AND BALANCING (TAB)
23 51 80 INSULATION – HVAC
23 57 60 HEAT PUMP UNITS
23 57 70 PACKAGED UNITS
23 58 20 FANS
23 58 30 ELECTRIC HEATERS – HVAC
23 58 40 DUCTWORK
23 58 60 DUCT ACCESSORIES
23 58 70 OUTLETS
23 58 80 FILTERS
23 90 00 CONTROLS

DIVISION 26 – ELECTRICAL

26 05 10 ELECTRICAL GENERAL
26 00 30 COORDINATION
26 05 15 CONDUCTORS
26 05 21 GROUNDING
26 05 30 FIRESTOPPING
26 05 31 RACEWAYS
26 05 32 OUTLET BOXES AND JUNCTION BOXES
26 05 73 SHORT CIRCUIT AND PROTECTIVE DEVICE COORDINATION STUDY
26 24 16 PANELBOARDS
26 27 26 WIRING DEVICES
26 28 13 FUSES
26 28 16 ENCLOSED SWITCHES AND CIRCUIT BREAKERS
26 50 00 LIGHTING

DIVISION 27 – COMMUNICATIONS

27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS
27 05 53 IDENTIFICATION FOR COMMUNICATIONS SYSTEMS
27 15 00 COMMUNICATIONS HORIZONTAL CABLING

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 31 11 DIGITAL ADDRESSABLE FIRE ALARM SYSTEM
28 55 00 RF SURVEY FOR IN-BUILDING TWO-WAY EMERGENCY RESPONDER COMMUNICATION ENHANCEMENT SYSTEM

DIVISION 31 - SITE

31 10 00 SITE CLEARING
31 13 00 SELECTIVE TREE AND SHRUB REMOVAL AND TRANSPLANTING
31 13 16 SELECTIVE TREE AND SHRUB PROTECTION AND TRIMMING
31 20 00 EARTH MOVING
31 22 16.15 ROADWAY SUBGRADE PREPERATION
31 23 16.13 TRENCHING
31 23 16.16 STRUCTURAL EXCAVATION FOR MINOR STRUCTURES
31 23 33 TRENCHING AND BACKFILLING
31 25 00 EROSION CONTROL

DIVISION 32 - LANDSCAPE

32 11 23.33 DENSE GRADED BASE
32 12 16.13 HOT MIX ASPHALT PAVING
32 13 13 CONCRETE PAVING
32 13 73 CONCRETE PAVING AND JOINT SEALANTS
32 14 00 UNIT PAVING
32 14 43 POROUS UNIT PAVING
32 17 23 PAVEMENT MARKINGS
32 92 00 TURF AND GRASSES
32 93 00 PLANTS

DIVISION 33 - UTILITIES

33 11 00 WATER UTILITY DISTRIBUTION PIPING
33 33 00 SANITARY SEWERAGE UTILITIES
33 40 00 STORM DRAINAGE UTILITIES
33 71 73 ELECTRICAL UTILITY SERVICE

END OF TABLE OF CONTENTS FOR PROJECT MANUAL

ADVERTISEMENT FOR PREQUALIFICATION OF CONTRACTORS AND FOR BIDS FROM BIDDERS THAT ARE PREQUALIFIED

Sealed proposals will be received by City of Irondale, Location of Bid Opening, Council Chambers at 101 20th Street South, Irondale, Alabama, 35210; UNTIL 2:00 PM Local Time; on Thursday, February 15, 2024, for:

IRONDALE PUBLIC LIBRARY

at which time and place they will be publicly opened and read.

The project includes, but is not limited to, the construction of a 1-story, metal-framed construction with brick & stone veneer, precast panels and standing seam metal roof structure, with associated site work and all related work as indicated on the Bid and Construction Documents.

A cashier's check or bid bond payable to City of Irondale, Irondale, Alabama, in an amount not less than five percent (5%) of the amount of the bid, but in no event more than $10,000, must accompany the bidder's proposal. Performance and statutory Labor and Material Payment Bonds, and insurance in compliance with requirements, will be required at the signing of the Contract.

Drawings and Specifications will be available after January 16, 2024, to Prequalified project General Contractors; and may be examined at the Office of the Architect and AGC Internet Plan Rooms in Birmingham, Alabama.

Bidders may obtain documents from Alabama Graphics, for a non-refundable cost equal to the cost of printing (which is approximately $510.00). Digital copies are available from Alabama Graphics. Other sets for general contractors, and sets for subs and dealers, may be obtained at the same amount. *Partial sets will not be available.*

Notarized Contractor's Qualification Certificates must be submitted to the Architect along with any request to obtain Bid Documents by a General Contractor by **close of business on January 25, 2024**, and shall include the following information required by standard format of Form AIA A305: Company information, including: 1) Statutory license type, limits, type(s) of work and expiration date; 2) Bonding company and capacity; 3) Verification of successful history as a General Contractor with projects of similar size and scope under the name of the firm which will be bidding and contracting for the work, and verifiable successful history of completing these and other projects in a timely manner; and 4) E-Verify: For compliance with the Alabama Immigration Law, Act 2011 – 535. Note that any joint venture arrangements must qualify solely on the strength of the principal firm's prequalification information. **ONE digital** copy of this document shall be submitted to the Architect for review, and a decision regarding the prospective bidder's prequalification will be communicated to them within 5 working days.

Bids must be submitted on proposal forms furnished by the Architect or copies thereof. All bidders bidding in amounts exceeding that established by the State Licensing Board for General Contractors must be licensed under the Provision of Title 34, Chapter 8, Code of Alabama, 1975, as amended, and must show such evidence of license before bidding or bid will not be received or considered by Architect or Owner; The bidder shall show such evidence by clearly displaying their current license number on the outside of the sealed envelope in which the proposal is delivered; Bidder must also include their current license number on the Proposal Form. No bid may be withdrawn after the scheduled closing time for receipt of bids for a period of NINETY (90) days.

A **MANDATORY PRE-BID CONFERENCE** will be held at the same location where bids will be received, at **2:00 PM, on Thursday, February 1, 2024**, for the purpose of reviewing the project and answering Bidder's questions. **Attendance at the Pre-Bid Conference is required by all prequalified General Contractors** , and is highly recommended for all Subcontractors.

This project is being bid without sales taxes according to Act 2013-205 (of the Alabama Legislature). However sales tax for the base bid and all other bid items must be accounted for on the contractor's Bid

Proposal Form. ABC Form C-3A indicates how the sales tax shall be accounted for on the bid proposal form and shall be modified by the project architect as appropriate for bid items on each project.

Completion Time: Work shall commence on the earlier of either the date of the owner's written "Notice to Proceed" or the contractor's receipt of the fully executed contract and shall be **"Substantially Complete" within 420 Consecutive Calendar Days thereafter.**

Supervision: Contractor to provide Superintendent(s) to ensure proper supervision for all work.

The Owner reserves the right to reject any or all proposals and to waive technical errors if, in their judgment, the best interests of the Owner will thereby be promoted.

City of Irondale
101 20th Street South
Irondale, Alabama 35210

Architect:
Charles Williams & Associates Inc.
3601 8th Ave. So.
Birmingham, AL 35222
Phone: (205) 250-0700
Attn: Christa Vandiver
christa@cwilliams-arch.com

Program Manager:
Kemp Management Solutions, LLC.
3029 2nd Avenue South
Birmingham, AL 35233
Phone: (205) 731-7372
Attn: Keltin J. Garrett
kgarrett@KempMS.net

TO ADVERTISE:

Montgomery Advertiser	January 14th, 21st, and 28th
Tuscaloosa News	January 14th and 21st
Birmingham Times	January 18th

NOTE: For projects exceeding $100,000, this notice must be run once a week for three successive weeks in a newspaper of general circulation in the county or counties in which the project, or any part of the project, is to be performed (except once for municipalities). If the project involves an estimated amount exceeding $500,000, this notice must also be run at least once in three newspapers of general circulation throughout the state. Proof of publication is required.

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

1.00 RELATED DOCUMENTS

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

1.01 INTENT

A. This section is included in the Bid Documents to give information required to properly prepare the Bids and are hereby made a part of the Contract Documents.

1.02 SCOPE

A. The Contractor shall submit a LUMP SUM BASE BID proposal which shall include all costs for the Irondale Public Library located at **1032 Grants Mill Road, Irondale, AL 35210** and all systems, services and structures as required for this project as provided in the construction documents.

B. It is the intent of these documents to require the contractor to include in his bid all costs involved for the coordination of all trades to the successful completion of this project as specifically outlined, required, or reasonably implied.

C. PROJECT SUMMARY: Construction of a new one-story library with metal stud and steel framed construction, with brick, precast and stone veneer.

D. A PRE-BID CONFERENCE will be held as indicated in the INVITATION TO BID.

1.03 PROPOSAL

A. All bids submitted shall be prepared in conformity with and shall be based upon and submitted, subject to all requirements of the Specifications and Drawings.

B. Bid Documents shall be enclosed in an envelope which shall be sealed and clearly labeled "Sealed Bid" and the name of the project so as to guard against opening prior to the time set therefore. The bidder shall be responsible for the placement of his firm's name, name of the job and Contractor's license number on the outside of the envelope. A current copy of the General Contractor's license shall be attached to the Form of Proposal. Submit bids in duplicate.

C. The Owner may consider as informal any bid on which there is an alteration or departure from the form of proposal hereto attached.

D. Under the Alabama State Code, Section 39-2-4 as amended by Act 97-225, it is required

for any contract exceeding $50,000.00 that the bidder submit with his bid a cashier's check drawn on a local bank, or a bid bond executed by a surety company duly authorized and qualified to make such bonds in the State of Alabama, payable to the City of Irondale in an amount (subject to a maximum of $10,000.00) equal to five percent (5%) of the bid. In order for a bid to be considered, it must be accompanied by an acceptable bid bond or check.

E. The successful Bidder shall be required to execute a Performance and Labor and Material Bond covering and including labor and materials in an amount equal to 100% of the contract price.

1.04 BID PROCEDURE

A. The Owner reserves the right to waive informalities and/or technicalities, to reject any or all bids without explanation to bidders, and to make award as best interest to Owner appears.

If the bid proposal contains bid alternates, the low bid will be determined by the base bid and the inclusion of the sum total of all bid alternates selected by the City. The City reserves the right to select any individual or combination of bid alternates regardless of the order in which they are listed in the bid proposal form and based on the best interest of the City. In order to enable the City to properly evaluate bids, each alternate should be bid. In the event a bid is not provided for any alternate selected by the City for inclusion in the project, then that bid shall be considered non-responsive. In the event a bid is not received on any alternate which the City chooses not to include in the project, then the total of the base bid and selected alternates shall be considered a responsive bid.

If no change in the base bid is required for any alternate, enter "NO CHANGE."

B. Bids received prior to time of opening will be securely kept unopened. All bid envelopes shall be delivered to the location indicated in the Invitation to Bid, and will be given a printed time and date stamp to indicate that they were received no later than the time and date indicated in the Invitation to Bid. Bids may be rejected if received after the stipulated time and date and not considered.

C. Bidders are cautioned to allow ample time for transmittal by mail or otherwise.

D. Bids may be withdrawn or modified on written or telegraphic request dispatched by the bidder in time for delivery in normal course of business prior to time fixed for opening, provided that telegraphic withdrawal is confirmed in writing over the signature of the Bidder within 48 hours thereafter. Negligence on the part of the Bidder in preparing the bid confers no right for withdrawal of the bid after it has been opened. If the low bidder discovers a mistake in its bid rendering a price substantially out of proportion to that of other bidders, the low bidder may seek withdrawal of its bid without forfeiture upon

written notice to the Owner within three (3) working days after the opening of bids whether or not award has been made. If the low bidder offers clear and convincing documentary evidence as soon as possible, but no later than three (3) working days after the opening of bids, that it made such a mistake due to calculation or clerical error, an inadvertent omission, or a typographical error, the Owner shall permit withdrawal without forfeiture. The decision of the Owner shall be made within ten (10) days after receipt of the low bidder's evidence. In no event shall a mistake of law, judgment or opinion constitute a valid ground for withdrawal of a bid without forfeiture. Upon withdrawal of a bid without forfeiture, the low bidder shall be prohibited from: (1) doing any work on the contract, either as a subcontractor or in any other capacity, and (2) bidding on the same project if it is re-advertised for letting.

E. Erasures or other changes in the bids must be explained or noted over the signature of the Bidder.

F. In event of disagreement between bid prices and proposal forms submitted, as between words and figures, words shall govern.

G. No bidder may withdraw his bid for sixty (60) days after scheduled time and date set for opening thereof.

H. All cashier's checks or bid bonds will be returned immediately to all except the three lowest bona fide Bidders. Bid bonds shall be returned to the three (3) lowest bona fide Bidders when the Contract is signed and bonds furnished by the successful Bidder.

I. The contract shall be awarded to the lowest responsible and responsive bidder, unless the Owner finds that all the bids are unreasonable or that it is not in the interest of the Owner to accept any of the bids. A responsible bidder is one who, among other qualities determined necessary for performance, is competent, experienced, and financially able to perform the contract. A responsive bidder is one who submits a bid that complies with the terms and conditions of the Invitation for Bids. Minor irregularities in the bid shall not defeat responsiveness.

J. After bids are opened, the three (3) lowest responsive bidders will be required to furnish a thorough written breakdown of their bids for validation. The breakdown shall be complete enough to indicate that all major materials, labor, bonds and permits, overhead and profit, taxes, insurance, allowance, etc. have been included as part of the bid. The Owner reserves the right to consider as non-responsive the bid of any bidder failing to deliver this written breakdown within three (3) calendar days after the bids are opened, or of any Bidder failing to provide written clarification or additional detail to the written breakdown within three (3) calendar days of the receipt of such request.

1.05 EXAMINATION OF DOCUMENTS AND SITE

A. Each bidder submitting a proposal for this Work shall examine the documents and the premises to satisfy himself as to the existing conditions under which he will be obliged to

operate in performing his part of the work and that will in any manner affect the work under this contract. All proposals shall take into consideration all such conditions as may affect the work under this contract. By submitting a bid, the bidder "affirms" that he has visited the site of the work and understands the Contract Documents.

B. In the event of discovery of discrepancies between the dimensions shown in the drawings and those actually existing, the contractor shall report these to the Architect at least 5 days prior to the Bid. The Architect will check and if clarification is needed, clarification will be made by Addendum. In the event discrepancies between drawings and actual dimensions are not clarified, "it will be deemed that the Bid was prepared on the basis of the most expensive way of doing the work involved."

C. Each bidder submitting a proposal shall examine the documents and site to satisfy himself that all of the work contained in the documents complies with the Americans with Disabilities Act.

1.06 EXPLANATION AND INTERPRETATIONS

A. Should any omission, discrepancy, ambiguity, or area in the Drawings and Specifications, or in any of the Contract Documents be discovered, or should there be any doubt as to the meaning or intent thereof, report such findings to the Architect in writing. Questions should be received by the Architect at least five (5) days prior to the date set for receiving of bids. The Architect will check discrepancy and if clarification is needed, clarification will be issued by Addendum. In the event the omission, discrepancy or ambiguity is not clarified, "it will be deemed that the Bid was prepared on the basis of the most expensive way of doing the work involved."

B. Clarification will be made by Addendum, which will be sent to all prospective Bidders on record, or if time does not permit, will be announced at the place prior to the time bids are to be opened.

C. Neither the Owner nor the Architect will be responsible for verbal answers regarding the intent or meaning of any of the contract documents.

1.07 SUBSTITUTIONS

A. To obtain approval to use unspecified products, Bidders shall submit written request at least ten (10) days before the bid date and hour. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including all data necessary to demonstrate acceptability. If the product is acceptable, the Architect will approve it in an Addendum issued to all prime bidders on record.

1.08 TIME FOR COMPLETION

A. It is hereby understood and mutually agreed by and between the Contractor and the

Owner that the date of beginning and the time for completion of the work to be done hereunder are essential conditions of this contract; and it is further mutually understood that the Work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed" and shall be completed on or before the date set forth in the "Notice to Proceed".

B. The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed by and between the contractor and the Owner that the time for the completion of work described herein is a reasonable time for completion of same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

C. Delays occasioned by strike occurring on the job during the performance of the work, riots, civil commotions and change orders agreed upon by the Owner and the Contractor shall be the only exceptions for which a request for extension may be made. Any claim that the work has been delayed by any such strike, riot, or civil commotion shall be made in writing to the Owner no more than ten (10) days after the delay begins; otherwise, such claim shall be waived, and the work shall be completed without extension for such delay. Time is of the essence of this contract.

D. Time for completion of this contract shall be 330 calendar days from the Notice to Proceed as adjusted per Supplemental General Conditions, Section 00800, Paragraph 3.10.5.

1.09 USE OF FOREIGN MATERIALS

A. In accordance with Act Number 97-225, Bill Number H-275 enacted by the 1997 Legislature of Alabama, the Contractor shall use in the execution of the contract materials, supplies, and products manufactured, mined, processed, or otherwise produced in the United States or its territories, if same are available at reasonable and competitive prices.

B. In the event the contractor breaches the agreement to use domestic products, and domestic products are not used, there shall be a downward adjustment in the contract price equal to any realized savings or benefits to the contractor.

C. The contractor shall use steel produced within the United States when specifications in the construction contract require the use of steel. If the Owner decides that the procurement of the above-mentioned domestic steel products becomes impractical as a result of a national emergency, national strike, or other cause, the Owner shall waive the above restriction.

D. In the event the contractor violates the domestic steel requirements, and domestic steel is not used, there shall be a downward adjustment in the contract price equal to any savings or benefits to the contractor.

1.10 FIRE PRECAUTION

A. Emergency fire protection shall be provided, using extinguishers, said equipment to the requirements of the National Board of Fire Underwriters' and relevant Insurance Company. Particular care shall be exercised when using open flame and welding and cutting equipment; use only flame-proof type tarpaulins. Keep site clean and orderly with proper protection of combustibles while in use and in storage.

1.11 ADVERTISEMENT OF COMPLETION

A. Contractors performing contracts of one-hundred thousand dollars ($100,000.00) or more shall immediately after the completion of the contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the City or County in which the work was done, once a week for **four** (4) consecutive weeks.

B. In no case will a final settlement be made upon the contract until the expiration of thirty (30) days after the completion of the notice.

C. Proof of publication of this notice shall be submitted by the General Contractor to the Architect by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the county, the notice must be posted at the Courthouse for thirty (30) days and proof shall be made by the Judge of Probate, Sheriff, and the Contractor.

D. Contractors performing contracts of less than one-hundred thousand dollars ($100,000.00) shall immediately after completion of the contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the City or County in which the work was done for one week. The contractor shall furnish the Purchasing Department by affidavit of the publisher a printed copy of the notice published for posting on their bulletin board for one week. The contractor shall certify under oath that all bills have been paid in full. Final settlement with the contractor will be made after the notice has been posted for one entire week.

1.12 GUARANTEES AND BONDS

A. Contractor shall submit to Architect before final acceptance and final payment all warranties, guarantees, lien waivers, and surety bonds. All such documents shall show the name and location of the project and the name of the Owner.

1.13 PRE-CONSTRUCTION CONFERENCE

A. Prior to beginning any work on this project, a meeting shall be held with the Architect to review the requirements as they relate to the work schedule, method of approach, and bring attention to all specific job requirements.

1.14 PROTECTION OF EXISTING STRUCTURE

A. The Contractor shall protect the existing property from damage caused by his work or workman, and be responsible for the repair of any damage thus caused.

1.15 TEMPORARY FACILITIES PROVIDED BY THE CONTRACTOR

A. The Contractor shall provide all temporary facilities as required.

1.16 SAFETY AND HEALTH REGULATIONS

A. Full compliance is required to the Department of Labor, Bureau of Labor Standards, "Safety and Health Regulations for Construction," as published in the Federal Register, Volume 36, Number 75, dated Saturday, April 17, 1971, as may be applicable to this project, or any later revision.

1.17 COMPLIANCE WITH LOCAL REQUIREMENTS

A. All work shall be accomplished in accordance with applicable sections of all Local, County, State and Federal Law, Codes or Ordinances. Contractor shall be responsible for all fees, permits, impact fees, licenses, etc.

1.18 EQUAL OPPORTUNITY

A. The Contractor shall maintain policies of employment as follows:
   1. The Contractor and all subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, national origin or age. Such action shall include but not be limited to the following: employment upgrading, demotion or transfers, recruitment or recruitment advertising, layoff or termination, rate of pay or other forms of compensation, and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.
   2. The Contractor and all subcontractors shall, in all solicitation or advertisement for employees placed by them or on their behalf state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, national origin or age.

1.19 TAX FREE PURCHASE OF MATERIALS FOR PROJECT

A. Contractor understands, acknowledges, and agrees that it is responsible for purchasing and supplying all building materials and construction materials that are to be included in

the Project ("Materials"), and that it, not the City, is exclusively obligated to compensate vendors who furnish those Materials. Further, the Contractor and City intend that the Contractor and any Subcontractors utilize the procedures for exemption of state and local sales and use taxes on Materials as stipulated by and in compliance with Act 2013-205 (the "Act") to preclude the imposition of those taxes on the Project, and to account for the sales and use tax savings in the bid form for the Project. To that end, Contractor agrees that after the City notifies the Contractor of its selection to perform the Project, the Contractor and its Subcontractors will apply for and secure the sales and use tax exemption certificate Form STC-1 "Sales and Use Tax Certificate of Exemption for Government Entity Projects." The City may refuse to award a contract for the Project (or withdraw any award) if Contractor or Subcontractors do not furnish to the City proof of issuance of the Certificate. Further, following the award of that contract, Contractor agrees to use such Certificate for all purchases of Materials in a manner that complies with the Act, to file reports of tax-exempt purchases with the Alabama Department of Revenue (ADOR) as contemplated in the Act and otherwise comply with any rules, regulations or other requirements that may be promulgated by the Alabama Department of Revenue or other divisions of the State of Alabama in connection therewith.

Contractor further agrees as follows to defend, indemnify and hold the City (and any of its employees, officials and representatives) harmless from any actions, demands, losses, expenses (including reasonable attorney's fees and litigation costs) and claims asserted by any third party (including, but not limited to, the State of Alabama) that arise out or result from Contractor's or Subcontractor's use or misuse of its Certificate of Exemption, its failure to comply with the Act (or rules and regulations concerning that Act) or its breach any of its covenants in this provision. Additionally, Contractor and Subcontractors further agree to (a) maintain records of its purchases of Materials and other transactions related to the Project for a period of not less than eighteen (18) months following its completion, and (b) at the request of the City's Director of Finance or other Director or their designees (the "City Representatives"), provide for inspection at a designated time and place all books and records, accounts, statements, evaluations, and other documents needed by the City Representatives to conduct an audit or financial/operational review of the following subjects: the purchase of Materials on the Project; amounts billed by Materials vendors; amounts paid by Contractor or Subcontractors to Materials vendors; and all records related to Contractor's or Subcontractors' compliance with its obligations under this provision and the contract for the Project. If Contractor refuses to honor City's request for an audit or documentation related to such matters within ten (10) days after that request, that refusal shall constitute a material breach of the contract for the Project.

The Contractor's bid shall not include sales tax, but the sales tax for the base bid and all alternate bid items must be included on the Form of Proposal-Attachment, Section 00201, indicating how the sales tax shall be accounted for. Failure of the Contractor to complete the attachment to the Form of Proposal indicating the sales tax as required by the Act shall render the bid non-responsive.

1.20 IMMIGRATION ACT COMPLIANCE

A. Contractor represents and warrants that it does not knowingly employ, hire for employment, or continue to employ an "unauthorized alien," as defined by the Beason-Hammon Alabama Taxpayer and Citizen Protection Act, §31-13-1, *et seq*., Code of Alabama 1975, as amended (the "Act").

B. Contractor represents and warrants that it will enroll in the E-Verify program prior to performing any work on the Project and shall provide documentation establishing that Contractor is enrolled in the E-Verify program. During the performance of this Agreement, Contractor shall participate in the E-Verify program as required under the terms of the Act and shall verify every employee that is required to be verified according to the applicable federal rules and regulations.

C. Contractor agrees to comply with all applicable provisions of the Act with respect to its Subcontractors by entering into an agreement with or by obtaining an affidavit from such Subcontractors providing work for Contractor on the Project that such Subcontractors are in compliance with the Act with respect to their participation in the E-verify program. Contractor represents and warrants that Contractor shall not hire, retain or contract with any Subcontractor to work on the Project which Contractor knows is not in compliance with the Act.

D. By signing this Contract, the contracting parties affirm, for the duration of the Agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

END OF SECTION

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SECTION 00 42 13

PROPOSAL FORM

TO: City of Irondale
101 20th Street South
Irondale, AL 35210
ATTN: James D Stewart, Jr.

1. The undersigned contractor (herein "Contractor") having carefully examined the Contract Documents, the site of the work, and the conditions affecting the work, hereby proposes and agrees, if this proposal is accepted, to enter into Contract, furnish bonds in the forms specified and to furnish supervision, labor, equipment and materials required for the IRONDALE PUBLIC LIBRARY, for the City of Irondale ("the City"), located at 1032 Grants Mill Road, Irondale, AL 35210 ("the Project").

2. The Contractor agrees to perform the work in accordance with the Contract Documents as prepared for and distributed by the Charles Williams and Associates dated November 16, 2023 for the sum of:

   _____DOLLARS($_____)
   (the "Contract Sum").

3. The Contractor further agrees to submit to the Architect within seven business days from the bid date a complete breakdown of all labor, equipment and material to be used in the Project, including those estimated by the subcontractors, showing at a minimum all labor cost and material cost at the divisional level and following the format of the Contractor's pay request. The requirement must be met before any funds will be released to the Contractor by the City.

4. TIME FOR COMPLETION of this project shall be 420 calendar days from the date of Notice to Proceed as may be adjusted per the Contract.

5. LIQUIDATED DAMAGES will be assessed in favor of the City for failure to achieve substantial completion within the allotted time. See Supplemental General Conditions, Section 9.11.2 for a schedule of Liquidated Damages.

6. In submitting this bid, Contractor understands that the City reserves the right to reject all bids and that this bid may not be withdrawn for a period of sixty (60) days from the opening thereof.

7. Contractor further agrees that at the time the City delivers to the Contractor a Contract for execution, the undersigned Contractor will within fifteen (15) days after date of such delivery, execute and deliver to the Architect the signed Contract, the required bonds and proof of insurance in accordance with the Contract Documents.

8. Contractor further agrees that if it fails to execute the Contract and present the required Contract bonds and proofs of insurance within fifteen (15) calendar days after being given written notice of award of this Contract, the City may retain from the Contractor's bid guaranty (if it is a cashier's check) or from the surety (if the guaranty is a bid bond), the difference between the amount of the Contract as awarded and the amount of the proposal of the next lowest bidder or the amount of the guaranty, whichever is lesser. If no other bids are received, the full amount of the guaranty may be retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the City.

9. In submitting this bid, the Contractor certifies that there has been no collusion with any person in respect to this bid or any other bid or the submitting of bids for the Contract for which this bid is submitted.

10. The Contractor hereby certifies that in employment of personnel it does not discriminate against any person or persons, on account of race, creed, color, sex, or national origin. The Bidder represents that it has read, understands, and will comply with Instructions to Bidders regarding the Chelsea Plan-Construction Industry Program.

11. The receipt of the following addenda is acknowledged:

ADDENDUM NO. 1 DATED _____
ADDENDUM NO. 2 DATED _____

BY: _____ TITLE: _____

COMPANY: _____

ADDRESS: _____

MAILING ADDRESS: _____

TELEPHONE: _____

If Bidder Is a Corporation, State: _____
Name of officer Certified by Board of Directors to execute Contract Binding Bidder

_____
State of Incorporation of Bidder:

If Bidder is a Partnership, State: _____

_____

_____

Full Name of All Partners

For any bid of $50,000 or more, the bidder MUST attach a photocopy or other evidence of current General Contractor's License No., current bid limit and type(s) of work for which the Contractor is currently licensed.

DATE:_____

END OF SECTION

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SECTION 00 42 13a

PROPOSAL FORM ATTACHMENT

ACCOUNTING OF SALES TAX
Attachment to Proposal Form-Section 00 42 13

To: City of Irondale
Date: _____
Name of Project: Irondale Public Library

SALES TAX ACCOUNTING

Pursuant to Act 2013-205, Section 1(g) the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

ESTIMATED SALES TAX AMOUNT

BASE BID: $_____

Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.

Legal Name of Bidder_____

Mailing Address_____

*By (Legal Signature)_____

*Name (type or print)_____ *(Seal)*

*Title_____

Telephone Number_____

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SECTION 00 43 12

ADVERTISEMENT FOR COMPLETION

LEGAL NOTICE

IN ACCORDANCE WITH SECTION 39-1 AS AMENDED BY H275 CODE OF ALABAMA, 1997,

NOTICE IS HEREBY GIVEN THAT _____

CONTRACTOR(S) HAVE COMPLETED _____

FOR THE CITY OF IRONDALE AND HAVE MADE REQUEST FOR FINAL SETTLEMENT

OF SAID CONTRACT.

CONTRACTOR _____

BUSINESS ADDRESS _____

END OF SECTION

SECTION 00 43 13

SALES TAX EXEMPTION FORMS

ST: EXC-01
8/18

Reset

ALABAMA DEPARTMENT OF REVENUE
SALES AND USE TAX DIVISION
P.O. Box 327710 • Montgomery, AL 36132-7710

Application For Sales and Use Tax Certificate of Exemption

FOR GOVERNMENT ENTITY PROJECT

This Certificate of Exemption will be limited to purchases which qualify for an exemption of sales and use taxes pursuant to Rule No. 810-6-3-.77

PROJECT INFORMATION:

PROJECT NAME			PROJECT OWNER'S FEIN (EXEMPT ENTITY)
STREET ADDRESS OF PROJECT (CITY AND COUNTY INCLUDED)	CITY	ZIP	COUNTY

APPLICANT'S INFORMATION:

RELATION: *(CHOOSE ONE)*

☐ Government Entity ☐ General Contractor ☐ Subcontractor

APPLICANT'S LEGAL NAME				FEIN
DBA				CONSUMER'S USE TAX ACCOUNT NUMBER
MAILING ADDRESS: STREET	CITY	STATE	ZIP	COUNTY
CONTACT PERSON				BUSINESS TELEPHONE NUMBER ( )
EMAIL ADDRESS				

PROJECT START DATE (PROVIDED BY GENERAL CONTRACTOR)	PROJECT COMPLETION DATE (PROVIDED BY GENERAL CONTRACTOR)
ESTIMATED START DATE (FOR APPLICANT)	ESTIMATED COMPLETION DATE (FOR APPLICANT)
WILL THE APPLICANT HAVE ANY SUBCONTRACTORS ON THIS JOB? ☐ Yes ☐ No If yes, please attach list.	NAME OF PARTY TO THE CONTRACT

JOB DESCRIPTION

WILL ANY POLLUTION CONTROL EXEMPTION BE APPLICABLE? ☐ Yes ☐ No	ESTIMATED POLLUTION CONTROL COST $	
TOTAL PROJECT BID AMOUNT (APPLICANT'S PORTION OF PROJECT) $	LABOR COST (APPLICANT'S PORTION OF PROJECT) $	MATERIAL COST (APPLICANT'S PORTION OF PROJECT) $

REVENUE DEPARTMENT USE ONLY

PENDING DOCUMENTATION / INFORMATION:

☐ GCL ☐ SBL ☐ Contract / NTP / LOI ☐ LOS ☐ Project Dates / Breakdown of Costs

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

PAGE 1

PROJECT NAME	PROJECT OWNER'S FEIN (EXEMPT ENTITY)

FORM OF OWNERSHIP:

☐ Individual ☐ Partnership ☐ Corporation ☐ Multi member LLC ☐ Single member LLC ☐ Government Entity

If applicant is a corporation, a copy of the certified certificate of incorporation, amended certificate of incorporation, certificate of authority, or articles of incorporation should be attached. If the applicant is a limited liability company or a limited liability partnership, a copy of the certified articles of organization should be attached.

OWNERSHIP INFORMATION:

Corporations – give name, title, home address, and Social Security Number of each officer.

Partnerships – give name, home address, Social Security Number or FEIN of each partner.

Sole Proprietorships – give name, home address, Social Security Number of owner.

LLC – give name, home address, and Social Security Number or FEIN of each member.

LLP – give name, home address, and Social Security Number or FEIN of each partner.

NAME *(PLEASE PRINT)* SIGNATURE

TITLE DATE

REVENUE DEPARTMENT USE ONLY

PENDING OTHER:

☐ Government Entity ☐ General Contractor ☐ Not on LOS

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

Examiner's Remarks _____

Examiner _____ Date _____

PAGE 2

Instructions For Preparation of Form ST: EXC-01
Sales and Use Tax Certificate of Exemption for Government Entity Project

NOTE: Exemption Certificates will be issued as of the project start date or the received date of the application. If, upon receipt of the application, the project has already commenced, the certificate will be issued as of the received date of the application. Any purchases made prior to the issuance of a certificate will not be exempt.

*** **Please allow 10 to 14 business days for your application to be processed.** ***

In order to expedite the processing of your application, please include the following documentation when submitting your application:

Exempt Entity:
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed

General Contractor:
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed
3. List of Subcontractors
4. Alabama Board of General Contractor's License
5. State/County Business License (usually obtained through county probate office)
6. Any other municipal business licenses associated with the project

Subcontractor:
1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. Any other municipal business licenses associated with the project
5. List of Subcontractors (if any)

General contractors and subcontractors:
- Any additions and/or deletions to the list of subcontractors working on a project must be submitted to the Department within 30 days of occurrence.
- If an extension is needed for a project, please contact the Department of Revenue at the address, number, or email listed below. Extension requests should be submitted no more than 30 days after expiration date.
- Subcontractor's Estimated Start Date should be the date they will begin working on the project and ordering mate-rials instead of the General Contractor's Estimated Start Date for the project.

THERE IS A FILING REQUIREMENT IF YOUR APPLICATION IS APPROVED. The return will be filed through the Consumer's Use Tax account. Please see the following page for detailed instructions and general information regarding the reporting requirements.

The application and required documentation may be mailed, faxed, or emailed to the following:

Fax: (334) 353-7867

Email: STExemptionUnit@revenue.alabama.gov

Mailing Address: ATTN: Contractor's Exemption
Alabama Department of Revenue
Sales & Use Tax Division
Room 4303
PO Box 327710
Montgomery, AL 36132-7710

General Information and Instructions Regarding the Reporting Requirements for Contractors Awarded an Exemption Certificate

A contractor's exemption certificate for a Government Entity project is needed in order to purchase materials tax exempt for the qualified project. Once the exemption certificate has been applied for and awarded, there is a monthly filing requirement to report the purchases that have been made for each exempt project. The Consumer's Use (CNU) tax account is used to report the tax-exempt purchases made with each certificate for each exempt project for each month.

The consumer's use tax return must be filed for each of the months covered by the exemption certificate. (For example, if the certificate's effective date is June 29, 2014 and the expected completion date is October 1, 2014, a consumer's use tax return must be filed for each of the following months: June, July, August, September, and October.) A return MUST be filed each month to report the monthly purchases. Therefore, all active exemption certificates must be included on the monthly report even if the monthly purchases for a specific project was $0.

If a CNU tax account is not already open under the taxpayer/business name, one will automatically be assigned at the time the exemption certificate is generated. Electronic filing is required through the Department's online filing system, My Alabama Taxes (MAT). A letter containing the online filing information will be mailed to the address on file within a few days after the new CNU tax account has been assigned. This letter will contain all the information needed to create your online filing account in MAT. For questions relating to setting up the account on www.myalabamataxes.alabama.gov, please contact Business Registration at 334-242-1584 or the Sales Tax Division at 1-866-576-6531.

Once the MAT account is set up, please log in and file the monthly CNU tax return. There is a table located at the bottom left hand corner labeled "Contractor's Exemption for Government Construction Projects." All three fields in the table are required to be completed: exemption number, project number, and total amount of purchases for that specific project for the month. Additional projects may be added on the additional rows that appear as data is added; the table will allow the addition of more projects.

***Please do not use lines 1 through 9 of the return for reporting exempt project information. Leave these lines blank unless taxable purchases were made outside of the state of Alabama that need to be reported and tax remitted. (Lines 1 through 9 do not have anything to do with the exemption reporting requirements).

When the certificate expires (upon the project's completion) and the CNU tax account is no longer needed, please contact the Business Registration Unit at 334-242-1584 and close the CNU tax account. Please be advised that if there are multiple government entity projects open, the consumer's use tax account should remain open until the last project completion date. For example, if Project EXC00ABCD ends in June of 2014 but Project EXC00EFGH ends January of 2015, the CNU tax account must remain open until the end of January 2015. A return for Project EXC00EFGH must be filed all the way through January 2015.

If the applicant already has a CNU tax account and it is currently set up online, please use this account to report exempt project purchases through www.myalabamataxes.alabama.gov using the instructions provided above. The return may then be filed as usual.

***All Consumer's Use Tax returns are due on the 20th of the month following the month in which purchases were made (i.e., the return for the month of June is due July 20th, etc. There are 20 days to file the return before it is deemed late.)

***Any penalty waiver requests may be directed to the Sales and Use Tax Division at 1-866-576-6531. Only one waiver per 18 month period is allowed.

SECTION 00 43 14 - STORED MATERIALS LOG

STORED MATERIAL LOG

PAGE OF

APPLICATION NO.:
APPLICATION DATE:

NO.	DESCRIPTION OF MATERIAL	VALUE	ON SITE	OFF SITE COMPANY	OFF SITE ADDRESS	OFF SITE TELEPHONE	PHOTO #
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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33							
34							
35							

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SECTION 00 43 80

PARTIAL RELEASE OF LIEN

Date: _____

Name of Firm:_____

Total Contract Amount:……..…… $_____

Percent of Contract Complete:…… _____%

Value of Contract Complete:…….. $_____

Previous Amount Paid:…… $_____

Amount Due this Application:…… $_____

The undersigned Lien, in consideration of value received, hereby releases its lien and right

to claim a Lien to the extent of $_____, or for labor, services, or materials
TOTAL AMOUNT PAID

furnished through _____ , except _____
DATE PAID

to the following property: Irondale Public Library
1032 Grants Mill Road
Irondale, AL 35210

By_____ Date:_____
SUBCONTRACTOR

_____
TITLE

NOTRAY PUBLIC STAMP

Signed, sealed and delivered in the presence of:

_____ Date: _____
Notary Public

My Commission Expires _____

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SECTION 00 60 00

PROJECT FORMS

1.00 GENERAL

A. The following documents, prepared by the American Institute of Architects shall apply to and form a part of the Contract Documents for this project.

AIA A101 Contract Agreement for Construction

AIA A201 General Conditions of the Contract for Construction

AIA A310 Bid Bond

AIA A312 Performance Bond and Payment Bond

AIA G701 Change Order

AIA G703 Continuation Sheet for G702

AIA G704 Certificate of Substantial Completion

AIA G706 Contractor's Affidavit of Payment of Debts and Claims

AIA G706A Contractor's Affidavit of Release of Liens

AIA G707 Consent of Surety of Final Payment

B. Copies of the printed AIA Documents, may be purchased from the office of the Chelsea Chapter of the American Institute of Architects, 107 South 21 Street, Chelsea, Alabama or from the American Institute of Architects, 1735 New York Avenue, NW, Washington, D.C. 20006.

END OF SECTION

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SECTION 00 65 19

WAIVER OF LIEN

Know All By These Presents: that_____
NAME OF FIRM

For and in consideration of $_____ Dollars and other good and valuable
TOTAL AMOUT PAID

considerations, lawful money of the United States of America, to me in hand paid, the receipt

whereof is hereby acknowledged, does hereby waive, release, remise and relinquish any and all

right to claim any lien or liens for work done or material furnished or any kind or class of lien

whatsoever on the following described property:

_____
PROJECT NAME

_____ Irondale, AL_____
STREET ADRESS ZIP CODE

By _____ Date: _____
SUBCONTRACTOR

_____
TITLE

Signed, sealed and delivered in the presence of:
NOTRAY PUBLIC STAMP

_____ Date:
_____
Notary Public

My Commission Expires _____

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SECTION 00 72 13

GENERAL CONDITIONS

PART ONE - GENERAL

A. The General Conditions of the Contract for Construction, AIA Document A201 American Institute of Architects, 1997 Edition, Article 1 through 14 inclusive, hereinafter referred to as the General Conditions, are hereby, except as the same may be inconsistent herewith, made a part of this Specification.

B. Where any article of the General Conditions is modified, added or deleted herein, the unaltered provisions of that Article shall remain in effect except for the supplemental provisions of those Article(s) specifically amended, voided, or superseded.

C. The General Conditions govern all sections of the specifications and are as binding as if repeated therein.

D. Copies of the printed form AIA Document No. A201 may be purchased from the American Institute of Architects, 1735 New York Avenue, Washington, D.C. 20006. Or online at www.aiacontracts.com

END OF SECTION

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SECTION 00 73 00

SUPPLEMENTAL GENERAL CONDITIONS

The following supplements modify, change, delete from or add to the "General Conditions of the Contract for Construction," American Institute of Architects Document A201, 1997 Edition. Where any Article, paragraph, subparagraph, or clause of the General Conditions is modified or deleted by these Supplemental Conditions, the provisions of the Article, paragraph, subparagraph or clause not specifically altered by these Supplemental Conditions shall remain in full effect.

The General Conditions also may be supplemented elsewhere in the Contract Documents by provisions located in, but not necessarily limited to, Division 1 of these Specifications.

The following paragraphs have been modified or added:

1.1.8	3.10.5	4.3.7.1	9.3.4	11.1.3.1	13.9.1
1.1.9	3.10.6	4.3.7.2	9.3.4.1	11.1.3.2	13.1
1.2.1.1	3.10.7	4.6	9.10.6	11.2.1	13.10.1
1.2.4	3.10.8	7.1	9.10.7	11.4	13.11
2.1.2	3.10.9	7.3.3.1	9.10.8	11.4.1	13.11.1
2.2.5	3.10.10	7.3.3.3	9.11.1	11.4.1.2	13.12
2.2.5.1	3.10.11	7.4.1	9.11.2	11.4.1.3	13.12.1
3.4.4	3.10.12	9.2.1	11.1.1	11.5.1.1	13.13
3.5.2	3.10.13	9.2.1.1	11.1.2	13.8	13.13.1
3.6.1	3.10.14	9.3.1	11.1.2.1	13.8.1	
3.10.4	4.3.5	9.3.1.1	11.1.2.2	13.9	

ARTICLE 1
GENERAL PROVISIONS
is supplemented as follows:

1.1.8 Where the terms DIRECTED, SELECTED, or APPROVED are used, they shall mean as directed, selected or approved by the ARCHITECT if deemed necessary.

Equal in quality and money value and similar in design or properties, shall mean in the ARCHITECT'S opinion.

1.2.1.1 Should the drawings disagree in themselves, or with the Specifications, the quality or greater quantity of work or material shall be estimated upon, and, unless otherwise authorized by the Architect in writing shall be performed or furnished. Figures given on drawings governing

scale measurements and large-scale details governing small scale drawings. Descriptive writings shall take precedence over code symbols.

1.2.4 Any reference to a publication by its basic designation only shall be a reference to the issue, edition, and amendment (if any) of that publication current on the date of these Documents to the extent indicated by the reference thereto.

ARTICLE 2
OWNER
is supplemented as follows:

2.1.2 Delete in its entirety

2.2.5 Delete in its entirety and replace with the following: Contractor shall be responsible for all reproduction costs. This price shall be included as a part of the Contractor's bid. Contractor shall keep one (1) copy of the Drawings and Specifications on the job for use of any interested parties.

The Architect will furnish all supplementary drawings and large scale details as necessary for clarification of the Work. Two (2) copies of such drawings or electronic PDF will be furnished. Contractor is responsible for all additional reproduction costs.

ARTICLE 3
CONTRACTOR
is supplemented as follows:

The Contractor acknowledges and agrees that the City has the right to deduct from the total amount of consideration to be paid, if any, to the Contractor under this agreement all unpaid, delinquent, or overdue license fees, taxes, fines, penalties and other amounts due the City from the Contractor.

3.4.4 Not later than fifteen (15) days from the Contract date, the Contractor shall provide a list showing the name of the manufacturer proposed to be used for each of the products proposed for use on this project.

3.5.2 The Contractor (and each subcontractor) shall furnish their respective written guarantee or warranties to and in favor of the Owner guaranteeing their Work to be free from faults and defects for a period of one (1) year, or for a longer period as may be prescribed by law or any applicable special guarantees required by the Contract Document, said period or periods of Warranty starting on date set forth in subparagraph 12.2.2 and as may be further modified.

3.6.1 Contractor shall not be required to pay taxes on equipment, materials and supplies purchased for and incorporated into the Work as Contractual agent of the City and, the cost of the purchases are paid directly to the vendor by the City, using Special Purchase Orders provided by the City. However, the amount of taxes that would otherwise be due shall be

included in the space provided on the Contractor's Pay Estimate, Section 00634 of this project manual. This amount is to be subtracted, along with the Cost of Materials, paid directly to vendors by the City, each month from the sum requested.

3.10.4 The following definitions apply to the following Construction Schedule Sections:

1. As - Planned - The original plan for accomplishing a task or project.
2. Contractor - The General Contractor who executes this contract.
3. Critical Path - The schedule logic path with the least total float.
4. Critical Path Method (CPM) - Technique used to develop a project schedule by establishing relationships between a group of activities to identify the sequencing of work necessary to complete the project within the contractual time frame.
5. Delay - An event or situation that prevents the contractor form completing a task or event.
6. Logic Path - A group of construction activities in a CPM schedule which impact one another through the establishment of predecessor/successor relationships and possess the same total float.
7. Milestone Activities - An activity representing the start or finish or a significant date or activity, which may or may not impact the overall project completion.
8. Negative Float - Total float (in days) less than zero indicating that the current projected completion date is later than the contractual completion date.
9. NOAA - National Oceanic and Atmospheric Administration.
10. Notice To Proceed - Document that provides written notification by THE CITY to the General Contractor authorizing him to proceed with the execution of construction on a specific date. This document also notes the contract duration and completion date.
11. Predecessor Activity - That activity that comes before another activity in the schedule.
12. Recovery Schedule - Schedule submitted by the General Contractor outlining his plan to make up delays to complete the project within the contractual time frame.
13. Successor Activity - That activity that comes after another activity in the schedule.
14. THE CITY - The City of Chelsea, a municipal corporation, located in the State of Alabama, or its authorized representative.
15. Total Float - The amount of time an activity can be delayed before it affects the project finish date or an intermediate deadline. Total float can be zero or negative in which case the activity is critical; or it can be positive in which case the activity is not critical.

The contractor shall meet with the City's Project Team (e.g., Architect, Project Manager and Scheduling Consultant) to develop an as-planned schedule which graphically details the Contractor's plan to construct the project within the contractual time frame. The Contractor's representatives attending this meeting should include the Project Manager, Project Superintendent and major subcontractor(s). The schedule shall be developed in a Critical Path Method (CPM) format and contain the following:
Complete sequencing of construction by activity;
Specific activities for each work task within the identified project areas;
Durations (in days) for each activity based upon the time it takes for assigned work crews to complete the task;
Specific activities noting shop drawing submittal and review periods;
Specific activities noting long lead material procurement and deliveries;

Milestone activities such as the project start, dry in, substantial completion, and final completion; A Critical Path identifying the logic path on the schedule with the least total float.

3.10.6 The construction schedule shall identify an initial "Notice to Proceed" milestone activity. All activities following the N.T.P. milestone shall have successor activities. The last activity in the schedule will be the substantial completion milestone, which will succeed the final work activity in the schedule.

3.10.7 Task durations shall be noted in days not to exceed (14) days in length unless otherwise directed by THE CITY.

3.10.8 THE CITY will computerize the as-planned schedule and distribute a printed copy to the Contractor for review and concurrence within ten (10) calendar days after the initial schedule development meeting. Any revisions to the schedule will be noted by the Contractor in writing and returned to THE CITY within seven (7) calendar days. THE CITY will make revisions to the schedule in accordance with this section and re-issue for review within seven (7) calendar days. The final as-planned construction schedule must be signed by THE CITY and the Contractor. The final approved as-planned schedule will become a target schedule. The target schedule will be distributed for implementation.

3.10.9 The target schedule will be used to measure the progress of the project.

3.10.10 THE CITY will incorporate the approved project schedule into its Capital Project Scheduling Database for management and updating.

3.10.11 The construction schedule will be updated on a bi-weekly basis or as directed by THE CITY. The contractor and any subcontractor whose work will begin, or is continuing before the next meeting will meet with THE CITY to review and discuss project activity and update the project schedule. Required update information that will be provided by the Contractor includes:
The actual start dates of tasks projected to begin or any other activities starting within the status period (based on the daily records);
The actual finish dates of tasks projected to end or any other activities finishing within the status period (based on the daily records);
Remaining durations of activities in progress during the update period based on the number or crew days remaining to complete the work;
Major modifications in the Contractor's work plan (schedule logic);
Items impacting the start, progress and/or completion of activities within the current or future update period;
All items which may jeopardize the completion of the project within the contractual time frame.

3.10.12 THE CITY will update the construction schedule based on the acquired information and distribute the schedule to the meeting participants within five (5) calendar days.

If the projected substantial completion date has negative float, the project is behind schedule. If the project is behind schedule, and upon written notification by THE CITY, the Contractor shall submit a recovery schedule to THE CITY identifying adjustments in the Contractor's work plan

and workforce to complete the project within the contractual time frame. The recovery schedule shall be submitted in accordance with the standards established in this section. The Contractor shall submit this recovery schedule within five (5) calendar days after the dated notification. If the Contractor fails to submit this recovery within the specified time frame, the Contractor shall be in non-compliance with these contract provisions and all payments will be withheld until the recovery schedule is submitted and approved by THE CITY. Failure on the part of the Contractor to submit the recovery schedule within ten (10) calendar days after notification will constitute a contractual default. THE CITY reserves the right to notify the Contractor's Bonding Agent of this contractual default.

Upon final approval, the recovery schedule will be incorporated into or supersede the original target schedule.

ARTICLE 4
ADMINISTRATION OF THE CONTRACT
is supplemented as follows:

4.3.5 Delete in its entirety and insert the following: Claims for Additional Cost. If the Contractor wishes to make Claim for an increase in the Contract Sum, written notice to each party as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Paragraph 10.6.

4.3.7.1 Delete in its entirety and insert the following: If the Contractor wishes to make Claim for an increase in the Contract Time, written notice to each party as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

4.3.7.2 Add a new paragraph 4.3.7.2.1 as follows: "Above average rain fall shall be considered adverse weather conditions tata are more sever than anticipated for the locality of the Work during any given month. Above average rain days shall be assessed and calculated as follows:
1. The total number of days in a month it rained more or equal to 0.10inches multiplied by a ratio derived by taking the result of the Actual Monthly Rainfall in inches per NOAA, less the 10 year Average Monthly Rainfall in inches for that Month per NOAA and dividing by the Actual Monthly Rainfall in inches per NOAA: [(Actual Monthly Rainfall in inches per NOAA) – (10 Year Average Monthly Rainfall in inches per NOAA)] / (Actual Monthly Rainfall in inches per NOAA). NOAA documentation shall be as recorded at the Chelsea International Airport.
2. The result of that multiplication is the amount of calendar days the Contractor can submit as a request for above average rain days provided all other requirements of Paragraph 4.3.7 and Article 8 are met."

4.6 ARBITRATION: Delete in its entirety, and by so doing, all other references to Arbitration in the General Conditions. The Owner will not participate in Arbitration. Deleted references to Arbitration shall include, but not be limited to subparagraphs 4.3.3, 4.3.6, 4.4.1, 4.4.5, 4.4.6, 4.4.8, 8.3.1., 9.7.1, 11.4.9, and 11.4.10.

ARTICLE 7
CHANGES IN THE WORK
is supplemented as follows:

7.1 GENERAL: Add the following: All changes to the Scope of Work for more than 10% of the bid amount or less than 10% of the bid amount must be re-bid. All Change Orders which will require additional funding or an extension of time must come before the Chelsea City Council for review and approval. Except as provided in Section 7.4.1, the Architect cannot approve change orders if the Chelsea City Council has not previously approved funding. The party or parties contracting with the City of Chelsea understand that it is their duty and obligation to secure funding before doing work not funded by the Chelsea City Council.

7.3.3.1 and 7.3.3.3: Add the following additional restrictions:
The allowance for overhead and profit combined, include the total cost to the Owner, shall be based upon the following schedule:
For the Contractor, for any work performed by his own forces 15% of the cost.
For each Subcontractor involved, Work performed by his own forces, 15% of the cost.
For the Contractor, for Work performed by his Subcontractor, 10% of the amount due the Subcontractor.
Cost shall be limited to the following: Cost of materials, including sales tax and cost of delivery, cost of labor, including Social Security, Old Age and Unemployment Insurance (Labor cost may include a pro-rata share of foreman's time, only in the case that an extension of the Contract Time is granted on account of the change); Workmen's Compensation Insurance, rental value of power tools and equipment.
Overhead shall include the following: Bond premiums, supervision, superintendence, wage of timekeepers, watchmen and clerks, small tools, incidents, general office expense and all other expenses not included in the "Cost."
If the net value of change results in a credit from the Contractor or Subcontractor the credit given shall be the net cost without overhead or profit. The cost as used herein shall include all items of labor, materials, and equipment.

7.4.1 Delete in its entirety and insert the following: The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, a copy of which shall be provided to the City Council at its next regular meeting thereafter, and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 9
PAYMENT AND COMPLETION
is supplemented as follows:

9.2.1 Modify as follows: Schedule of Values shall be submitted on AIA Document G703 Application and Certificate for Payment Continuation Sheet.

9.2.1.1 In addition to the Schedule of Values, the contractor shall also submit a Schedule of Labor and a Schedule of Materials in a form acceptable to the Architect.

9.3.1 Modify as follows: Application for Payment shall be submitted on City of Chelsea Pay Estimate Form Section 00634 of this Project Manual and AIA Document G703 Continuation Sheet.

Modify a follows: Until Substantial Completion, the Owner will pay the amount due the Contractor on account of progress payments less retainage of 5% of the first 50% of the contract amount.

Project Architect will review monthly Pay Request and forward to City within seven (7) calendar days. Pay Requests not approved by the Project Architect will be returned to the Contractor for clarifications/revisions and resubmitted. Upon receipt of monthly Pay Request from the Project Architect, the City shall have thirty (30) calendar days to review and verify invoices. Incorrect billing will be returned to the Contractor through the Project Architect for corrections and/or additional information as requested by the City.
When requested revisions are made to the Pay Request, the Contractor shall re-submit it to the Project Architect for re-submittal to the City.

9.3.4.1 All Applications for Payment, after the first Pay Request, shall be accompanied by a Partial Lien Waiver Form, provided by the City, signed and attested by all sub-contractors that received payments on the previous Application for Payment.

9.10.6 At the completion and acceptance of the Work, the Contractor shall, in addition to countersigned and warranted subcontract guarantees, guarantee all materials and workmanship for a period of one (1) year from the date of final certificate. In addition, the Contractor shall guarantee the water-tightness of the building for a period of one (1) year from the final certificate. All guarantees shall be written to the owner.

9.10.7 Certificate for final payment shall not relieve the Contractor of any responsibility for faulty materials or workmanship that may develop during the guarantee period. Under no circumstance shall the General Contractor be paid the 5% of the first 50% of the contract amount as Retainage until all subcontractors and all materials have been paid in full.

9.10.8 Immediately after completion of the Contract, the Contractor shall give notice of said completion by an advertisement in some newspaper of general circulation, published within Jefferson County, Alabama, once a week for a period of four (4) successive weeks. Proof of published of said notice shall be submitted by the Contractor to the City of Chelsea, in care of the Architect, by affidavit of the publisher and printed copy of the notice published . In no instance shall a final settlement be made upon the contract until the expiration of thirty (30) days from the completion of the notice.

Contractors performing contracts of less than fifty thousand dollars ($50,000), shall immediately after completion of the contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the City or County in which the work was

done for one (1) week. The Contractor shall furnish the Architect by affidavit of the publisher a

printed copy of the notice published for posting on their bulletin board for one week. The Contractor will be paid after the notice has been posted for one entire week.

9.11.1 LIQUIDATED DAMAGES: Should the Contractor or, in case of default, the surety fail to complete the work within the contractual time frame and no extension of contract time is guaranteed by THE CITY., a deduction for each calendar day that any work shall remain incomplete, an amount indicated by the Liquidated Damages Schedule provided in this section, shall be deducted from any monies due to the Contractor. Liquidated damages assessed provided in the specifications is not a penalty but is intended to compensate THE CITY for increased time in administrating the contract, supervision, inspection and engineering which required CITY forces for a longer time on any construction operation or phase than originally contemplated when the contract period was agreed upon in the contract. Permitting the Contractor to continue and finish the work or any part of it after the contractual completion date will in no way waive THE CITY'S rights under the contract. In the event the Contractor shall, for any reason, fall behind schedule, he shall promptly put double shifts of labor on the work and take such other steps as may be required to expedite the work to ensure that it shall be fully completed within the stated time at no extra cost to the Owner. Liquidated Damages shall be withheld from payments until the Contractor is no longer behind schedule.

9.11.2 SCHEDULE OF LIQUIDATED DAMAGES

ORIGINAL CONTRACT AMOUNT		LIQUIDATED DAMAGES
MORE THAN	UP TO AND INCLUDING	DAILY CHARGE PER CALENDAR DAY
0	$50,000	$100.00
$50,000	$100,000	$200.00
$100,000	$500,000	$500.00
$500,000	$1,000,000	$800.00
$1,000,000	$2,000,000	$1,100.00
$2,000,000	$5,000,000	$1,500.00
$5,000,000	$10,000,000	$1,700.00
$10,000,000		$2,000.00

Failure to comply with any requirements of this section may constitute a default of the contract.

ARTICLE 11
INSURANCE AND BONDS
is supplemented as follows:

11.1.1 In the first line following the word "maintain" insert the words "in a company or companies acceptable to the Owner and licensed to do business in the State where the Project is located."

11.1.2 Delete in its entirety and insert the following: The Contractor shall maintain such insurance as will protect himself and the Owner, its employees and the Owner's Architects and Engineers from direct, assumed and contingent liability, from claims under Workmen's Compensation Acts, and from any other claims for damages for personal injury including death or damage to property, which may arise from operations under this Contract, whether such operations be done by himself or by any person directly or indirectly employed by either of them; whether in consequence of any negligence or delay in performing or safeguarding the Work, use of defective or unacceptable materials, or any act or omission by him or his agents whereby any persons or property suffers in jury through his or his agent's fault. The Contractor and subcontractor or anyone directly or indirectly employed by either of them shall also maintain Comprehensive Automobile Liability Insurance against liability arising out of the ownership, maintenance, or use of all owner, non-owner and hired automobile equipment. In the event of such injuries or damages, the Contractor and Surety will save the Owner and its representatives harmless from all suits, actions, or claims thereby arising.

11.1.2.1 The contractor shall, before starting work, furnish to the Owner Certificates for Insurance as herein specified showing insurance in company acceptable to Owner. The policies of insurance shall be countersigned by a duly authorized and accredited agent of the carrier and shall contain the following clause: "The Owner shall have the right to take coverage upon the failure of the Contractor to provide the coverage and cost of such insurance shall be deducted from amounts owning to the Contractor."

11.1.2.2 The insurance shall extend to and include all the Contractor's operations, regardless of whether they may be in connection with work that is temporary, included in any of the bid items or classified as Extra Work. The cost of any and such insurance shall be paid for by the Contractor. Insurance coverage shall not be less than the following:

COVERAGE AMOUNT

1. Workmen's Compensation and Employer's Liability……..……Statutory
2. Comprehensive General Liability Bodily Injury…..……..……$1,000,000.00

. This policy shall: provide coverage on an Occurrence Basis, for injury to persons caused by long exposure as well as by an instantaneous happening. The policy shall be extended to include slander, libel and false arrest.

3. Comprehensive General Liability Property Damage. ……..….$600,000.00

The policy shall be endorsed to provide coverage on an Occurrence Basis. The policy shall be extended to include explosion, collapse, and damage to underground utilities.

4. Comprehensive Automobile Liability (per person)……..….$300,000.00
5. Bodily Injury including Death (per person)……..……..…..$1,000,000.00
6. Comprehensive Automobile Liability Property Damage ……..……$300,000.00
7. Owner's and Contractor's Protective. Policy-Bodily Injury……...…..$1,000,000.00
   Specifically naming the Owner and Architect/ Engineer as the Insured:
8. Property Damage……..….$600,000.00
9. Indemnity: The Contractor shall assume all liability for and shall indemnity and save harmless Owners, Architect and their employees from all damages and liability for injury to any person or persons, and injury to or destruction of property, including the loss of use thereof, by

reason of an accident or occurrence arising from operations under the Contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them, occurring on or about the premises or the ways and means immediately adjacent, during the term of the Contract or any extension thereof, and shall also assume the liability for injury and/or damages to adjacent or neighboring property by reasons of work done under the Contract. The obligations of the Contractor under this Paragraph shall not extend to the liability of Architect, his agent, or employees arising out of:
1) The preparation or approval of maps, drawings, opinion, reports, surveys, change orders, designs or specifications, or
2) The giving or the failure to give directions or instruction by the Architect, his agents or employees provided such giving of or failure to give is the primary cause of the injury or damage.

11.1.3.1 The Contractor shall not cause any insurance to be canceled or permit any insurance to lapse. All insurance policies shall include a clause to the effect that the policy shall not be canceled or reduced, restricted, or limited until thirty (30) days after the Owner has received written notice as evidenced by return receipt of registered or certified letter. Certificates of Insurances shall contain transcripts from the proper office of the insurer, evidencing in particular those insured, the extent of the insurance, location and the operation to which the insurance applies the expiration date and the above mentioned notice of cancellation clause.

11.1.3.2 Certificates called for in this Subsection shall be furnished in duplicate and specifically set forth evidence of all coverage required by 11.1.1 and 11.1.2 to the Architect and copies of any endorsement that are subsequently issued amending coverage or limits.

11.2.1 Delete in its entirety and replace with the following: OWNER'S LIABILITY INSURANCE: The Contractor shall purchase and maintain insurance covering the Owner, the Owner's Consultant contingent liability for claims which may arise from operations under the Contract. The policy shall be for the same limits of liability and shall contain the same specific endorsement which the Contractor places on the insurance required by Article 11, Subparagraph 1.1.1. This insurance shall conform to the requirements and the restrictions imposed by Article 11. The original policy and one (1) certified copy of the policy shall be filed with the Owner and the Architect.

11.4 Add the following Paragraph 11.3. before Paragraph 11.3.1 PROPERTY INSURANCE: The Contractor shall furnish and maintain Property Insurance described as follows: The policy shall be in the name of the Owner. It shall be for the same limits of liability and shall contain the same specific endorsements which the Contractor places on the insurance required by Article 11, Subparagraph 11.1.1. This insurance shall conform to the requirements and the restrictions imposed by Article 11. The original and once certified copy of the policy shall be filed with the Owner and the Architect.

11.4.1 Reference in line 1 to "Owner" shall be changed to "Contractor." Add the following clause: The amount of the insurance at all times to be at least equal to the amount paid on account of work and materials incorporated in the work and plus the value of the work and materials furnished or delivered but not yet paid for by the Owner. The policies shall be in the names of the Owner and the Contractor and "All Sub-contractors" as their interest appears,

and certificates of the insurance company as to the amount and type of coverage, terms of the policies, etc., shall be delivered to the Owner through the Architect before partial payments are made.

When changes in Scope of the work written Change Order or Change Orders aggregate an amount equal to 15% of the total contract, including the Change Order or Change Orders, the insurance coverage included under this heading shall be increased accordingly. Proof of coverage shall be established by endorsement to the original policy or by reissue of the original policy to include the added coverage, or in accordance with any other acceptable policy of the insuring company for increasing the coverage.

11.4.1.2 Delete in its entirety.

11.4.1.3 Delete in its entirety and replace with the following: If the property insurance requires minimum deductibles, the Contractor shall pay the costs not covered because of such deductibles.

11.5.1.1 The Contractor shall provide Performance Bond in the amount of one hundred percent (100%) of the Contract Price and Labor and Materials Payment Bond in the amount of one hundred percent (100%) of the Contract price.

ARTICLE 13
MISCELLANEOUS PROVISIONS
is supplemented as follows:

13.8 Application for Copyright Prohibited.

13.8.1 No reports or documents reproduced in whole or in part under this contract shall be the subject of an application for copyright by or on behalf of the Contractor.

13.9 Discrimination in Employment.

13.9.1 The Contractor shall not discriminate against any employee employed in the performance of this contract or against any applicant for employment in the performance of this contract because of race, creed, color, or national origin.

13.10 Political Activity Prohibited.

13.10.1 None of the funds, materials, property, or service contributed by the Owner or the Contractor under this contract shall be used in the performance of this contract for any partisan political activity, or to further the election or defeat of any candidate for public office.

13.11 Religious Activity Prohibited.

13.11.1 There shall be no religious worship, instruction or proselytization as part of or in connection with the performance of this Agreement.

13.12 Clean Air Act

13.12.1 The Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act of 1970.

13.13 Use of Foreign Materials

13.13.1 In accordance with Act Number 97-225, Bill Number H-275 enacted by the 1997 Legislature of Alabama, the Contractor shall use in the execution of the contract materials, supplies, and products manufactured, mined, processed, or otherwise produced in the United States or its territories, if same are available at reasonable and competitive prices. In the event the Contractor breaches the agreement to use domestic products, and domestic products are not used, there shall be a downward adjustment in the contract price equal to any realized savings or benefits to the Contractor. The Contractor shall use steel produced within the United States when specifications in the construction contract require the use of steel. If the Owner decides that the procurement of the above mentioned domestic steel products becomes impractical as a result of a national emergency, national strike, or other cause, the Owner shall waive the above restriction. In the event the Contractor violates the domestic steel requirements, and domestic steel is not used, there shall be a downward adjustment in the contract price equal to any savings or benefits to the Contractor.

SECTION 00 73 16

CONTRACTOR'S and SUBCONTRACTORS' INSURANCE

A. GENERAL

(1) RESPONSIBILITY. The Contractor shall be responsible to the Owner from the time of the signing of the Construction Contract or from the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the work by the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of who may be the owner of the property.

(2) INSURANCE PROVIDERS. Each of the insurance coverages required below shall be issued by an insurer licensed by the Insurance Commissioner to transact the business of insurance in the State of Alabama for the applicable line of insurance, and such insurer (or, for qualified self-insureds or group self-insureds, a specific excess insurer providing statutory limits) must have a Best Policyholders Rating of "A-" or better and a financial size rating of Class V or larger.

(3) NOTIFICATION ENDORSEMENT. Each policy shall be endorsed to provide that the insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire for any reason until thirty days after the Owner has received written notice by certified mail as evidenced by return receipt or until such time as other insurance coverage providing protection equal to protection called for in the Contract Documents shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the Project as shall have been designated by Project Name and Number in said notice.

(4) INSURANCE CERTIFICATES. The Contractor shall procure the insurance coverages identified below, or as otherwise required in the Contract Documents, at the Contractor's own expense, and to evidence that such insurance coverages are in effect, the Contractor shall furnish the Owner an insurance certificate(s) acceptable to the Owner and listing the Owner as the certificate holder. The insurance certificate(s) must be delivered to the Owner with the Construction Contract and Bonds for final approval and execution of the Construction Contract. The insurance certificate must provide the following:

(a) Name and address of authorized agent of the insurance company
(b) Name and address of insured
(c) Name of insurance company or companies
(d) Description of policies
(e) Policy Number(s)

(f) Policy Period(s)
(g) Limits of liability
(h) Name and address of Owner as certificate holder
(i) Project Name and Number, if any
(j) Signature of authorized agent of the insurance company
(k) Telephone number of authorized agent of the insurance company
(l) Mandatory thirty-day notice of cancellation / non-renewal / change

(5) MAXIMUM DEDUCTIBLE. Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed $25,000.00.

B. INSURANCE COVERAGES

Unless otherwise provided in the Contract Documents, the Contractor shall purchase the types of insurance coverages with liability limits not less than as follows:

(1) WORKERS' COMPENSATION and EMPLOYER'S LIABILITY INSURANCE

(a) Workers' Compensation coverage shall be provided in accordance with the statutory coverage required in Alabama. A group insurer must submit a certificate of authority from the Alabama Department of Industrial Relations approving the group insurance plan. A self-insurer must submit a certificate from the Alabama Department of Industrial Relations stating the Contractor qualifies to pay its own workers' compensation claims.

(b) Employer's Liability Insurance limits shall be at least:

1. Bodily Injury by Accident - $1,000,000 each accident

2. Bodily Injury by Disease - $1,000,000 each employee

(2) COMMERCIAL GENERAL LIABILITY INSURANCE

(a) Commercial General Liability Insurance, written on an ISO Occurrence Form (current edition as of the date of Advertisement for Bids) or equivalent, shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The Commercial General Liability Insurance shall provide at minimum the following limits:

Coverage Limit

1. General Aggregate $ 2,000,000.00 per Project

2. Products, Completed Operations Aggregate $ 2,000,000.00 per Project

3. Personal and Advertising Injury $ 1,000,000.00 per Occurrence

4. Each Occurrence $ 1,000,000.00

(b) Additional Requirements for Commercial General Liability Insurance:

1. The policy shall name the Owner, Architect, the city of Chelsea and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.

2. The policy must include separate per project aggregate limits.

(3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

(a) Commercial Business Automobile Liability Insurance which shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than $1,000,000 Combined Single Limits for each occurrence.

(b) The policy shall name the Owner, Architect, the city of Chelsea and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA LIABILITY INSURANCE

(a) Commercial Umbrella Liability Insurance to provide excess coverage above the

Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

(b) Minimum Combined Primary Commercial General Liability and Commercial/Excess Umbrella Limits of:

1. $ 5,000,000 per Occurrence

2. $ 5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella Liability Insurance:

1. The policy shall name the Owner, Architect, the city of Chelsea and their agents, consultants, and employees as additional insureds.

2. The policy must be on an "occurrence" basis.

(5) BUILDER'S RISK INSURANCE

(a) The Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of

the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

"The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

(i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; or

(ii) Partial or complete occupancy by Owner; or

(iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other contractors of the Owner, or by contractors of the lessee of the Owner."

C. SUBCONTRACTORS' INSURANCE

(1) WORKERS' COMPENSATION and EMPLOYER'S LIABILITY INSURANCE. The Contractor shall require each Subcontractor to obtain and maintain Workers' Compensation and Employer's Liability Insurance coverages as described in preceding Paragraph B, or to be covered by the Contractor's Workers' Compensation and Employer's Liability Insurance while performing Work under the Contract.

(2) LIABILITY INSURANCE. The Contractor shall require each Subcontractor to obtain and maintain adequate General Liability, Automobile Liability, and Umbrella Liability Insurance coverages similar to those described in preceding Paragraph B. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract.

(3) ENFORCEMENT RESPONSIBILITY. The Contractor shall have responsibility to enforce its Subcontractors' compliance with these or similar insurance requirements; however, the Contractor shall, upon request, provide the Architect or Owner acceptable evidence of insurance for any Subcontractor.

D. TERMINATION of OBLIGATION to INSURE

Unless otherwise expressly provided in the Contract Documents, the obligation to insure as provided herein shall continue as follows:

(1) BUILDER'S RISK INSURANCE. The obligation to insure under Subparagraph B(5) shall remain in effect until the Date of Substantial Completion as shall be established in the Certificate of Substantial Completion. In the event that multiple Certificates of Substantial Completion covering designated portions of the Work are issued, Builder's Risk coverage shall remain in effect until the Date of Substantial Completion as shall be established in the last issued Certificate of Substantial Completion. However, in the case that the Work involves separate buildings, Builder's Risk coverage of each

separate building may terminate on the Date of Substantial Completion as established in the Certificate of Substantial Completion issued for each building.

(2) PRODUCTS and COMPLETED OPERATIONS. The obligation to carry Products and Completed Operations coverage specified under Subparagraph B(2) shall remain in effect for two years after the Date(s) of Substantial Completion.

(3) ALL OTHER INSURANCE. The obligation to carry other insurance coverages specified under Subparagraphs B(1) through B(4) and Paragraph C shall remain in effect after the Date(s) of Substantial Completion until such time as all Work required by the Contract Documents is completed. Equal or similar insurance coverages shall remain in effect if, after completion of the Work, the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, returns to the Project to perform warranty or maintenance work pursuant to the terms of the Contract Documents.

E. WAIVERS of SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, sub-subcontractors, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to the person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work.

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E-Verify

Company ID Number: 434916

To be accepted as a participant in E-Verify, you should only sign the Employer's Section of the signature page. If you have any questions, contact E-Verify at 888-464-4218.

Employer **Alabama Department of Examiners of Public Accounts**	
Barry Smith	
Name (Please Type or Print)	Title
Electronically Signed	**07/26/2011**
Signature	Date
Department of Homeland Security – Verification Division	
USCIS Verification Division	
Name (Please Type or Print)	Title
Electronically Signed	**07/26/2011**
Signature	Date

Information Required for the E-Verify Program

Information relating to your Company:

Company Name:	**Alabama Department of Examiners of Public Accounts**
Company Facility Address:	**50 North Ripley Street, Rm. 3201**
	Montgomery, AL 36104-3833
Company Alternate Address:	**P.O. Box 302251**
	Montgomery, AL 36130-2251
County or Parish:	**MONTGOMERY**
Employer Identification Number:	**636000619**

E-Verify

Company ID Number: 434916

North American Industry Classification Systems Code:	921
Administrator:	
Number of Employees:	100 to 499
Number of Sites Verified for:	1

Are you verifying for more than 1 site? If yes, please provide the number of sites verified for in each State:

- ALABAMA 1 site(s)

Information relating to the Program Administrator(s) for your Company on policy questions or operational problems:

Name:	**Cynthia F Wright**		
Telephone Number:	**(334) 242 - 9200 ext. 45**	Fax Number:	**(334) 353 - 8818**
E-mail Address:	**cindy.wright@examiners.alabama.gov**		
Name:	**Barry F Smith**		
Telephone Number:	**(334) 242 - 9200 ext. 44**	Fax Number:	**(334) 353 - 8818**
E-mail Address:	**barry.smith@examiners.alabama.gov**		

SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS AND GENERAL INFORMATION

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

1.2 PROJECT/WORK IDENTIFICATION:

A. General: Project name is IRONDALE PUBLIC LIBRARY, Irondale Alabama, for the City of Irondale; as shown on the Contract Documents prepared by Charles Williams & Associates, Inc., dated November 16, 2023.

B. Contract Documents: Indicate the work of the Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated in the Contract Documents, in Base Bid and any alternates, include but are not necessarily limited to the following:

C. Coordination of the Work of the entire project.

D. Coordination and cooperation with other contractors working on the site.

E. New mechanical and electrical systems, and all related work.

F. New building fire protection / sprinkler system.

G. Site maintenance.

H. Construction of a new steel framed building with masonry, cast stone, and precast veneer on metal stud framing above ground. Metal stud interior partitions typical.

I. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions (if any), the Project Manual, Technical Specification Sections, Drawings, Addenda and modifications to the Contract Documents issued subsequent to the initial printing of this Project Manual and the Drawings, and including but not necessarily limited to printed material referenced by any of these. It is recognized that the Work of the Contract is also unavoidably affected or

influenced by governing regulations, natural phenomenon including weather conditions, and other forces outside the contract documents.

J. Abbreviated Written Summary: Briefly and without force and effect upon the contract documents, the Work of the Contract can be summarized as follows:

1. Refer to Paragraph 1.2-B above.

1.3 CONTRACTOR USE OF PREMISES:

A. General: During the construction period the Contractor shall have use of the premises for construction operations, as shown on the Drawings.

1. Limitations of use of the site:

a. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to applicable rules and regulations affecting the work while engaged in project construction. See site plan for egress and ingress to site, or if not indicated, same shall be as designated by the Owner.

b. Keep existing public roads, driveways and entrances serving the premises clear and available at all times. Do not use these areas for parking or storage of materials. Remove dirt, mud, debris, etc., from site, sidewalks, streets, and public right-of-way as it occurs.

c. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas indicated. If additional storage is necessary, obtain and pay for such storage off site in a fully bonded and insured facility acceptable to the Owner, with all items stored clearly identified as being assigned to this project.

d. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running, or the ignition key in place.

e. The Owner, and their representatives, the Architect and their Consultants, as well as authorities having jurisdiction will require site accessibility for inspections, observations, and perhaps other purposes, related to the planned new construction. The Contractor shall assist in such accessibility, to at least the point of providing and maintaining reasonably accessible dry paths to work in progress.

f. Provide secure temporary barricades, fencing, etc., as indicated or otherwise required, to restrict pedestrian and vehicular traffic from construction operations, including in part, Owner's staff, the public, children, and users of the immediately adjacent facilities. Fencing from Demolition project proceeding the construction project will be left in place to be changed over to awarded Contractor's responsibility.

g. Minimum construction fencing required (if any) shall be at locations indicated on the Drawings, or if not indicated, as required by the Contractor and with gates as required by the Contractor and/or authorities having jurisdiction, and all related safety and warning signs, etc. Removal of any temporary fencing, refilling post holes, etc., shall also be the responsibility of the Contractor.

h. Construction operations shall not affect in any manner, the on-going operations of the Owner, immediately adjacent facilities, adjacent property owners or businesses, or others. Refer to Division 1 Section "Special Conditions" for additional information and requirements regarding coordination with Owner's activities.

i. Construction equipment shall not come in contact with or swing over existing facilities to remain, public areas, occupied buildings, rights-of-ways, etc., which are to remain.

j. The Contractor and their employees shall limit any discussion of the Work of this project to the Owner's representatives named in the front of this Project Manual, Consultants employed, inspecting authorities with jurisdiction, and the Architect. In no instance shall this project be discussed with others, except as may otherwise be indicated herein.

k. Parking on-site, if any, shall be limited to the "staging areas" indicated on the Drawings, or if not indicated, as mutually agreed between the Owner, Architect, and Contractor at the Pre-Construction Conference.

l. Smoking or other use of tobacco products shall not be permitted within the Owner's facilities or on roofs.

m. The use or presence of alcohol and/or other debilitating substances shall not be permitted on the project site.

n. Firearms and/or other weapons shall not be permitted on the project site.

END OF SECTION 01 11 00

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SECTION 01 21 00

ALLOWANCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Division-1 Specification sections, apply to work of this section.

1. Coordinate allowance work with related work to ensure that it is completely integrated and interfaced with related work.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions and Explanations: Certain requirements of the work related to each allowance are shown and specified in contract documents. The allowance has been established in lieu of additional requirements for that work, and further requirements thereof (if any) will be issued by change order.

B. Types of allowances scheduled herein for the work included the following:

1. Lump sum allowances.

C. Selection and Purchase:

1. At earliest feasible date after award of Contract, advise Architect/Engineer of scheduled date when final selection and purchase of each product or system described by each allowance must be accomplished in order to avoid delays in performance of the work.

2. As requested by the Architect/Engineer, obtain and submit proposals for the work of each allowance for use in making final selections; include recommendations for selection which are relevant to the proper performance of the work.

3. Purchase products and systems as specified, and as selected (in writing) by the Architect/Engineer.

4. Submit proposals and recommendations, for purchase of products or systems of allowances, in form specified for change orders.

D. Change Order Data: Include in each change order proposal both the quantities of products being purchased and unit costs, along with total

amount of purchases to be made. Where requested, furnish survey-of-requirements data to substantiate quantities. Indicate applicable taxes, delivery charges, amounts of applicable trade discounts, and other relevant details as requested by the Architect.

1. Each change order amount for allowances shall be based on the unit price difference between the actual purchase amount and the allowance, multiplied by the final measure or count of work-in-place, with reasonable allowances, where applicable, for cutting losses, tolerances, mixing wastes, normal product imperfections and similar margins.

2. Include 10% overhead and profit separately, in the Contractor's Base Bid, and not as part of Allowances.

3. When requested, prepare explanations and documentation to substantiate the quantities, costs, and margins as claimed.

E. Change Order Mark-Up:

1. Except as otherwise indicated, comply with provisions of General Conditions. For each allowance, Contractor's claims for increased costs (for either purchase amount or Contractor's handling, labor, installation, overhead, and profit), because of a change in scope or nature of the allowance work as described in contract documents, must be submitted within 60 days of initial change order authorizing work to proceed on that allowance; otherwise, such claims will be rejected.

2. Where it is not economically feasible to return unused material to the manufacturer/supplier for credit, prepare unused material for the Owner's storage, and deliver to the Owner's storage space as directed. Otherwise, disposal of excess material is the Contractor's responsibility.

F. Time and Allowance Amounts:

1. Nothing in the Bid or Contract Documents shall be so constructed or interpreted as to provide a Contract time extension, due to use or non-use of any Allowance amount.

2. Nothing in the Bid or Contract Documents shall be so constructed or interpreted as to allow unused Allowances or any portion thereof, nor any overhead and profit therefore to be retained by or paid to the Contractor.

   a. <u>Amount of unused allowances be returned shall include unused amount plus 10% overhead and profit.</u>

PART 2 – PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.1 SCHEDULE OF ALLOWANCES:

A. **Allowance No. 1 – Contingency Allowance:**

1. Allow a lump sum of **$350,000.00** for additional work, as directed by the Architect and Owner, including purchase, any applicable taxes and fees, and all related costs.

2. Include overhead and profit of at least 10% in Base Bid, and not as part of Allowance.

B. **Allowances No. 2 – GENERAL EXCAVATION UNDERCUT AND REPLACEMENT:**

1. The following items will be included as an allowance based on units and quantities along with the unit prices provided per the specifications. The contractor will only be able to utilize these allowances when the required excavation exceeds what is required by the Specifications and as directed by the Owner's Geotechnical Engineer. This allowance is not to be used to correct subgrade damage caused by construction traffic or contractor neglect.

   The contractor will only use this allowance when properly authorized prior to preforming the additional work paid for from the allowance.

   a. Unit Price Item No. XX – Undercut and Backfill of Unsuitable Material.

      6,000 cy x $ _____ per cy = _____.

C. **Allowance No. 3 – ROCK, MASONRY, OR CONCRETE EXCAVATION IN TRENCHES AND PITS:**

1. The following items will be included as an allowance based on units and quantities along with the unit prices provided per the specifications. The contractor will only be able to utilize these allowances when the required excavation exceeds what is required by the Specifications and as directed by the Owner's Geotechnical Engineer. This allowance is not to be used to correct subgrade damage caused by construction traffic or contractor neglect. The contractor will only use this allowance when properly

authorized prior to performing the additional work paid for from the allowance.

a. Unit Price Item No. 5 – Rock, Masonry, or Concrete

Excavation in Trenches and Pits.

100 cy x $ _____ per cy = _____.

END OF SECTION 01 21 00

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SECTION 01 22 00

UNIT PRICES

PART 1 – GENERAL

1.1 SUMMARY

A. This section specifies administrative and procedural requirement for unit prices.

1. A unit price is an amount proposed by Bidders, as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased, in accordance the General Conditions and/or other provisions of the Bid and Contract Documents.
2. Unit prices shall include all necessary material, labor, fees, layout, supervision (field and home office), general expenses, insurance, bonds, overhead, profit and applicable taxes, for unit item of work in place.
3. Refer to other Division 1 Sections and individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of approval, verification, measurement and payment for unit prices are specified in those sections.

B. Related work specified elsewhere includes:

1. Division 1 – "Special Conditions"
2. Division 9 – "Painting"

C. Schedule:

1. A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
2. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 – PRODUCTS

2.1 Not Applicable.

PART 3 – EXECUTION

3.1 ITEMIZED UNIT PRICE SCHEDULE:

A. Item No. 1 – Mass Earth Excavation:

1. Description: Remove unsuitable earth (including but not limited to soil, rock, and buried construction debris), and legally dispose of off-site, including earth not needed, or not suitable for reuse, encountered in open excavations, in accordance with Section 31 20 00 - "Earth Moving".
2. Unit of Measure: Cubic yard (CY) of earth excavated.

B. Item No. 2 – Trench Earth Excavation:

1. Description: Remove unsuitable earth (including but not limited to soil, rock, and buried construction debris), and legally dispose of off-site, including earth not needed, or not suitable for reuse, encountered in trenches, in accordance with Section 31 20 00 - "Earth Moving".
2. Unit of Measure: Cubic yard (CY) of earth excavated.

C. Item No. 3 – Hand Earth Excavation:

1. Description: Remove unsuitable earth (including but not limited to soil, rock, and buried construction debris), and legally dispose of off-site, including earth not needed or not suitable for reuse, which must be excavated by hand, in accordance with Section 31 20 00 - "Earth Moving".
2. Unit of Measure: Cubic yard (CY) of earth excavated.

D. Item No. 4 – Additional Soil:

1. Item No. 4a - Topsoil:
   a. Description: Provide additional topsoil from offsite locations, in accordance with Section 31 20 00 "Earth Moving", and applicable portions of other sections.
   b. Unit of Measure: Cubic yard (CY) of topsoil, in place.
2. Item No. 4b - General or Open Site Areas:
   a. Description: Provide acceptable earth fill in general or open site areas, compacted to meet requirements specified for the affected area, in accordance with Section 31 20 00 "Earth Moving."

b. Unit of Measure: Cubic yard (CY) of fill, compacted in place.

3. Item No. 4c - Trench Backfill:

   a. Description: Provide acceptable backfill in trenches, compacted to meet requirements specified for the affected area, in accordance with Section 31 20 00 "Earth Moving."

   b. Unit of Measure: Cubic yard (CY) of backfill, compacted in place.

4. Item No. 4d - Select Fill:

   a. Description: Provide acceptable select fill obtained from offsite locations, compacted to meet the requirements specified for the affected area, in accordance with Section 31 20 00 "Earth Moving" and 02 32 00 "Geotechnical Report".

   b. Unit of Measure: Cubic Yard (CY) of fill, compacted in place.

E. Item No. 5 – Rock, Masonry, or Concrete Excavation in Trenches and Pits:

1. Description: Remove rock, masonry, and/or concrete encountered in trenches and pits, below elevations indicated, and legally dispose of offsite, in accordance with Section 31 20 00 "Earth Moving".
2. Unit of Measure: Cubic Yard (CY) of rock, masonry, or concrete excavated.

F. Item No. 6 – Rock, Masonry, or Concrete Excavation in Open Excavation:

1. Description: Remove rock, masonry, and/or concrete encountered in open excavations, below elevations indicated, and legally dispose of off-site, in accordance with Section 31 20 00 - Earth Moving".
2. Unit of Measure: Cubic Yard (CY) of rock, masonry, or concrete excavated.

G. Item No. 7 – Sod:

1. Description: Provide additional sod as directed, including fine grading, soil amendments, fertilizers, sod, maintenance, etc., as specified in Division 32.
2. Unit of Measure: Square yard (SY) of sod, in place.

H. Item No. 8 – Concrete Mud Footings:

1. Description: Provide additional concrete mud footings, in addition to any mud footings indicated on the Drawings, as specified in Division 3, as directed, where required by the Project Geotechnical Consultant due to any existing unsuitable soils.

2. Unit of Measure: Cubic yard (CY) of concrete mud footings, in place.
3. Note: This unit price is not applicable to cost of mud footings that are required due to over-excavation, or due to not pouring footings the same date they are excavated, or other reasons indicated in Section 31 20 00 - "Earth Moving," or Section 03 30 00 - "Cast-in-Place Concrete".

I. Item No. 9 – Undercut & Backfill in Building Control Areas:

1. Description: Undercutting and removal of existing uncontrolled fill material below planned subgrade in building control areas, and at least 10-feet beyond, as required due to careful inspection by probing, proof-rolling, and testing shall be paid on a unit price basis per cubic yard of undercut. Unit price shall include excavation and legal off-site disposal of unsuitable material and replacement with compacted controlled fill back to subgrade elevation in cuts and back to original grade in fills in accordance with Section 31 32 00 - "Earth Moving". This shall not apply to previously prepared areas of the site that may become unstable due to construction traffic, rain, etc.
2. Unit of Measure: Cubic Yard (CY) of unsuitable material.

J. Item No. 10 – Undercut & Backfill in Non-Building Control Areas.

1. Description: Undercutting and removal of existing uncontrolled fill material to a depth of 6' below planned subgrade in all areas not included in the building control areas as required due to careful inspection by probing, proof-rolling, and testing shall be paid on a unit price basis per cubic yard of undercut. Unit price shall include excavation and legal off-site disposal of unsuitable material and replacement with compacted controlled fill back to subgrade elevation in cuts and back to original grade in fills in accordance with Section 31 20 00 - "Earth Moving". This shall not apply to previously prepared areas of the site that may become unstable due to construction traffic, rain, etc.
2. Unit of Measure: Cubic Yard (CY) of unsuitable material.

K. Item No. 11 – Crushed Stone.

1. Description: Provide additional crushed stone, ALDOT 825B or approved equal, as directed by the Owner's Geotechnical Engineer.
2. Unit of Measure: Ton (TN) of crushed stone in place.

L. Item No. 12 – Concrete Sidewalk.

1. Description: Install concrete sidewalk not otherwise shown on drawings, in location directed by Architect.
2. Unit of Measure: Square Foot (SF) of sidewalk installed.

END OF SECTION 01 22 00

SECTION 01 26 00

CONTRACT MODIFICATION PROCDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

1. 01 60 00 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, that may or may not involve an adjustment to the Contract Sum or the Contract Time, as an Architect's Supplemental Instructions, "ASI".

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time in the form of an ASI. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. ASIs issued by Architect, if adjustments to contract sum or contract time are involved, are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within time specified in ASI after receipt of ASI, 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 delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision, broken up by hour, 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. Include data as needed to validate material costs

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect. Coordination and cooperation with other contractors working on the site.

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, broken up by hour, 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 01 60 00 "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Change Order, Architect will issue a Change Order for signatures as required.

1.6 FORCE ACCOUNT

A. A. Force Account: Architect may issue a change under the rules of Force Account at any time. A Force Account instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The rules of "Force Account" are covered in the General Conditions of the contract.

END OF SECTION 01 26 00

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SECTION 01 26 20

WEATHER DELAYS

PART 1-GENERAL

1.1 EXTENSIONS OF CONTRACT TIME

A. If the basis exists for an extension of time in accordance with Article 23 of the General Conditions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for that month.

B. Approved weather delay days will be accumulated and reconciled at the end of the project.

1.2 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

A. The owner has reviewed weather data available from the National Oceanic and Atmospheric Administration and determined a Standard Baseline of average climatic range for the State of Alabama.

B. Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the work and is not eligible for extension of contract time.

C. Standard Baseline is as follows:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
12	11	8	7	7	6	7	5	4	5	6	11	0

1.3 ADVERSE WEATHER AND WEATHER DELAY DAYS

A. Adverse Weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours:

1. precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure

2. temperatures which do not rise above 32 degrees F by 10:00 a.m.

3. temperatures which do not rise above that specified for the day's construction activity by 10:00 a.m., if any is specified

5. standing snow in excess of one inch (1.00")

C. Adverse Weather may include, if appropriate, "dry-out" or "mud" days:

1. for rain days above the standard baseline;

2. only if there is a hindrance to site access or sitework, such as excavation, backfill, and footings; and,

3. at a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the standard baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Architect.

D. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the contractor's scheduled work day, including a weekend day or holiday if Contractor has scheduled construction activity that day.

E. Contractor shall take into account that certain construction activities are more affected by adverse weather and seasonal conditions than other activities, and that "dry-out" or "mud" days are not eligible to be counted as Weather Delay Day until the standard baseline is exceeded. Hence, Contractor should allow for an appropriate number of additional days associated with the Standard Baseline days in which such applicable construction activities are expected to be prevented and suspended.

1.4 DOCUMENTATION AND SUBMITTALS

A. WEATHER DELAY REPORT:

1. Use a copy of Section 01 26 20 as a Weather Delay Report, indicating for each calendar month the days on which construction activity affecting the critical path of the Work was prevented by weather conditions.

2. Indicate the measurement of precipitation, and in the column for the cause: temperature, wind, or other influencing factors.

3. Describe the construction activity that was scheduled, on the critical path, and delayed.

4. At the end of the month, add up the number of days delay, subtract the baseline number given in this Section, and show the resulting claimable days in excess of baseline.

5. Submit a copy of the completed report with the next application for payment. Reports submitted with applications for payment do not constitute a claim or preliminary claim for extension of time.

6. A copy of the report is required each month, even if there are no days in excess of the baseline. This is for record keeping purposes.

B. When making a claim for a time extension based on weather delay(s):

1. Submit a copy of all reports completed since the last month for which a time extension was previously claim, or the commencement of Work if no previous claim, through the last month for which delay is being claimed. Claims for time extension based upon weather delays are unjustified if a submitted report does not corroborate the claim or if no report was submitted when it was required with an application for payment.

2. Submit daily jobsite work logs showing which and to what extent construction activities have been affected by weather on a monthly basis.

3. Submit actual weather data to support claim for time extension obtained from nearest NOAA weather station or other independently verified source approved by Architect at beginning of project.

4. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for Claims established in Article 12 of the General Conditions, and the applicable General Requirements.

5. If an extension of the Contract Time is appropriate, it shall be implemented in accordance with the provisions of Articles 23 of the General Conditions, and the applicable General Requirements.

SECTION 01 26 20

WEATHER DELAY REPORT

Month and Year reported Below	CWA Project Number and Project Name

Date	Check box if applicaple	Weather Conditions Causing Delay	Work Scheduled on critical path for this day that was delayed
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
		Total Number of Days this Month with Delay Due to Weather	
		Baseline Number from Section 01 26 20	
		Total - Baseline = Claimable Days	

END OF SECTION 01 26 20

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

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

1. Coordination Drawings
2. Administrative and supervisory personnel
3. Project meetings
4. Requests for Interpretation (RFIs)

B. Related Sections include the following:

1. Division 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
2. Division 01 70 00 "Execution and Closeout Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.
4. Division 01 31 00 "Project Management Communications" for additional project team communication requirements for this project.

1.3 DEFINITIONS

A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

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 that depend on each other for proper installation, connection, and operation.

   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

   2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.

   3. Make adequate provisions to accommodate items scheduled for later installation.

   4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. 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.
9. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

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

1.5 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

b. Indicate required installation sequences.

c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 42 inches.

3. Format: Shop Drawings are to be submitted through the E-Builder website. For submittals requiring an actual hard copy to be reviewed: Submit three opaque copies of each submittal in a drawing format. Architect will return one copy.

a. Submit five copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain two copies; remainder will be returned to Contractor who shall mark up all three copies of drawings as required, and to establish a Project Record document. Contractor shall submit two of the marked-up copies with his close out document's submittal.

4. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers.

1. Post copies of list in Project meeting room and in temporary field office. Keep list current at all times.

2. **"Include resumes for key project personnel with list of completed projects, including Name, Location, Square Footage, Cost, and Duration for Project Manager and Superintendent."**

1.6 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: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three working days of the meeting.

4. Schedule a preconstruction conference before starting construction, at a time convenient to the Architect, Owner, and Building Commission Inspector.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Building Commission Inspector; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.

    b. Critical work sequencing and long-lead items.

    c. Designation of key personnel and their duties.

    d. Procedures for processing field decisions and Change Orders.

    e. Procedures for RFIs.

    f. Procedures for testing and inspecting.

    g. Procedures for processing Applications for Payment.

    h. Distribution of the Contract Documents.

    i. Submittal procedures.

    j. Preparation of Record Documents.

    k. Use of the premises and existing building.

    l. Work restrictions.

    m. Owner's occupancy requirements.

    n. Responsibility for temporary facilities and controls.

    o. Parking availability.

    p. Office, work, and storage areas.

    q. Equipment deliveries and priorities.

    r. First aid.

    s. Security.

    t. Progress cleaning.

    u. Working hours.

    v. Phasing.

C. Minutes: Architect will record and distribute meeting minutes from the Pre-Construction Meeting.

D. Pre-installation Conferences: Conduct a pre-installation 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. The 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 problems.

   k. Time schedules.

   l. Weather limitations.

   m. Manufacturer's written recommendations.

   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 parties who should have been present.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

E. Progress Meetings: Conduct progress meetings at bi-weekly intervals, subject to change at the discretion of the Owner or Owner's representative. Coordinate dates of meetings with preparation of payment requests.

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 conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. 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 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.

Contractor and major subcontractors to submit and review 2 week look ahead schedules.

1) Review schedule for next period.

   a. Review present and future needs of each entity 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) Status of correction of deficient items.
      14) Field observations.
      15) RFIs.
      16) Status of proposal requests.
      17) Pending changes.
      18) Status of Change Orders.
      19) Pending claims and disputes.
      20) Documentation of information for payment requests.

3. Minutes: Record the meeting minutes.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

   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. Pre-Roofing Conference: A pre-work conference is required before any roofing materials are installed. This conference shall be conducted by a representative of the Architect, Building Commission Inspector and attended by representatives of the General Contractor, the Roofing Contractor, the Sheet Metal Contractor, the Roofing and Roof Deck Manufacturers, and the

Owner. If equipment of substantial size is to be placed on the roof, the Rooftop Equipment Contractor must also attend this meeting.

G. The pre-work conference is intended to clarify application requirements and what work should be completed before roofing operations can begin. This would include a detailed review of the Architect's specifications, the roof plans, roof decking, flashing details, as well as any required clarification of architectural specifications in relation of the manufacturer's specification. Any conflict or incompatibility between the architectural specifications and the manufacturer's specification must be resolved.

H. If this pre-work conference cannot be satisfactorily concluded without further inspection and investigation by any of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should the work proceed without inspection of all roof deck areas and substantial agreement on all points.

I. The Architect will prepare a written report indicating actions taken and decisions made at this pre-work conference. This report will be made a part of the job record and copies will be forwarded to the General Contractor and the Owner. The Contractor shall forward copies to his subcontractors, manufacturers, and suppliers as named above.

1.7 REQUESTS FOR INTERPRETATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.

2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

3. RFI's to be submitted electronically through E-Builder only. Correspondence to copy Architect and Owner.

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

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. RFI number, numbered sequentially.

6. Specification Section number and title and related paragraphs, as appropriate.
7. Drawing number and detail references, as appropriate.
8. Field dimensions and conditions, as appropriate.
9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
10. Contractor's signature.
11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Architect's Action: Architect will review each RFI, determine action required, and return it. RFIs received after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:

    a. Requests for approval of submittals.

    b. Requests for approval of substitutions.

    c. Requests for coordination information already indicated in the Contract Documents.

    d. Requests for adjustments in the Contract Time or the Contract Sum.

    e. Requests for interpretation of Architect's actions on submittals.

    f. Incomplete RFIs or RFIs with numerous errors.

2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.

3. 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 1 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 5 days of receipt of the RFI response.

D. 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 days if Contractor disagrees with response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log for Architect's review each month at least one work day prior to the monthly meeting. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work (ASI), Force Account, and Change Order Proposal Request (COR), as appropriate.

END OF SECTION 01 31 00

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SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Submittals Schedule.
3. Daily construction reports.
4. Material location reports.
5. Field condition reports.
6. Special reports.

B. Related Sections include the following:

1. Division 01 31 00 "Project Management and Coordination" for submitting the Schedule of Values.

2. Division 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.

3. Division 01 33 00 Section "Submittal Procedures" for submitting schedules and reports.

4. Division 01 40 00 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.

2. Specification Section number and title.

3. Submittal category (action or informational).

4. Name of subcontractor.

5. Description of the Work covered.

6. Scheduled date for Architect's final release or approval.

B. Contractor's Construction Schedule: Submit two copies of initial schedule, large enough to show entire schedule for entire construction period.

C. Daily Construction Reports: N/A

D. Photographic Documentation required with each Payment Application

1. Major work progress since previous Payment Application

2. Drone photos since previous Payment Application

E. Material Location Reports: Submit two copies at monthly intervals.

F. Field Condition Reports: Submit two copies at time of discovery of differing conditions.

G. Special Reports: Submit two copies at time of unusual event.

1.4 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 31 00 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Verify availability of qualified personnel needed to develop and update schedule.

2. Discuss any constraints.

3. Review time required for review of submittals and resubmittals.

4. Review requirements for tests and inspections by independent testing and inspecting agencies.

5. Review time required for completion and startup procedures.

6. Review and finalize list of construction activities to be included in schedule.

7. Review submittal requirements and procedures.

8. Review procedures for updating schedule.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 – PRODUCTS

2.1 SUBMITTALS SCHEDULE

Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Initial Submittal: Include submittals required during the first 60 days from the notice to proceed. List those 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.

CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Architect.

2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

4. Startup and Testing Time: Include not less than 14 days for startup and testing.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

Constraints: Include constraints and work restrictions, if any, and show how the

sequence of the Work is affected.

Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.

2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be broken down within principal contracts in amounts typically not greater than $30,000, but in no case greater than 5 percent of the Contract Sum.

3. Each activity cost shall reflect an accurate value subject to approval by Architect.

4. Total cost assigned to activities shall equal the total Contract Sum.

Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the time effect, if any, of the proposed change on the overall project schedule.

CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

General: Prepare network diagrams using AON (activity-on-node) format.

Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

   a. Preparation and processing of submittals.

   b. Mobilization and demobilization.

   c. Purchase of materials.

   d. Delivery.

   e. Fabrication.

   f. Utility interruptions.

   g. Installation.

   h. Work by Owner that may affect or be affected by Contractor's activities.

   i. Testing and commissioning.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3. Processing: Process data to produce output data on a computer-drawn, time scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

    a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.

Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Principal events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the Schedule of Values).

Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.

4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

    b. Submit value summary printouts one week before each regularly scheduled progress meeting.

REPORTS

Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request For Interpretation (RFI). Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

SPECIAL REPORTS

General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 – EXECUTION

CONTRACTOR'S CONSTRUCTION SCHEDULE

Contractor must employ skilled personnel with experience in scheduling and reporting techniques or must employ a scheduling consultant. Submit qualifications and examples of previous scheduling for evaluation (and approval) by the Architect.

Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule three (3) work days before each regularly scheduled progress meeting or Contractor may update schedule at the monthly progress meeting.

1. The revised schedule should be updated immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting, no later than three days after the progress meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate Actual Completion percentage for each activity.

Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, e-Builder, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.

2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Division 01 31 00 "Project Management and Coordination" for submitting Applications for Payment and the Schedule of Values.

2. Division 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.

3. Division 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.

4. Division 01 40 00 "Quality Requirements" for submitting test and inspection reports and for mockup requirements.

5. Division 01 77 00 "Closeout Procedures" for submitting warranties.

6. Division 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

7. Division 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.

8. Divisions 2 through 32 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect's responsive action.

B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: This job was prepared with Revit 2014 for all building components and CAD for all site and landscape components. Revit and Cad files will be made available upon request to the awarded General Contractor. A liability form must be signed and returned prior to delivery of the electronic files. These will be provided to the General Contractor only, for use and distribution as required.

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. 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. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals. **The Architect prefers electronic submittals for shop drawings. Contractor's review stamp still required on each submittal prior to review.**

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.

2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings. Provide another area of this same size for the Architect to affix his stamp. Stamp includes the following four categories: Reviewed, Furnish as Noted, Rejected, Revise and Resubmit; the Architect will mark one or more of these categories and return submittal to Contractor.

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

    a. Project name.

    b. Date.

    c. Name and address of Architect.

    d. Name and address of Contractor.

    e. Name and address of subcontractor.

    f. Name and address of supplier.

    g. Name of manufacturer.

    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000-01). Resubmittals shall include an alphabetic suffix after the sequence number (e.g., 061000-01R1 (R2, R3 etc. if necessary).

    i. Number and title of appropriate Specification Section.

    j. Drawing number and detail references, as appropriate.

    k. Location(s) where product is to be installed, as appropriate.

    l. Other necessary identification.

Deviations: Encircle or otherwise specifically identify deviations and list the deviations from the Contract Documents on submittals and list the deviations on the transmittal form accompanying submittal.

Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Use AIA Document G810 or equivalent with at least the following information.

    a. Project name.

    b. Date.

    c. Destination (To:).

    d. Source (From:).

    e. Names of subcontractor, manufacturer, and supplier.

    f. Category and type of submittal.

    g. Submittal purpose and description.

    h. Specification Section number and title.

    i. Drawing number and detail references, as appropriate.

    j. Transmittal number, numbered consecutively.

    k. Submittal and transmittal distribution record.

    l. Remarks.

    m. Signature of transmitter.

2. 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 label information as related submittal.

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 "Reviewed" or "Furnished as Noted".

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.

Use for Construction: Use only final submittals with mark indicating "Reviewed" or "Make Corrections Noted".

PART 2 – PRODUCTS

ACTION SUBMITTALS

General: Prepare and submit Action Submittals required by individual Specification Sections.

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 printed 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 written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operation and maintenance manuals.
    k. Compliance with specified referenced standards.
    l. Testing by recognized testing agency.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples.

5. Number of Copies: Submit one copy electronically of Product Data, unless otherwise indicated. Architect will return marked up file upon completed review.

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, unless submittal of Architect's CAD Drawings are otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Dimensions.

    b. Identification of products.

    c. Fabrication and installation drawings.

    d. Roughing-in and setting diagrams.

    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.

    f. Shopwork manufacturing instructions.

    g. Templates and patterns.

    h. Schedules.

    i. Design calculations.

    j. Compliance with specified standards.

    k. Notation of coordination requirements.

    l. Notation of dimensions established by field measurement.

    m. Relationship to adjoining construction clearly indicated.

    n. Seal and signature of professional engineer if specified.

    o. Wiring Diagrams: Differentiate between manufacturer-installed and field installed wiring.

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 but no larger than 24 by 36 inches.

3. Number of Copies:

a. Submit 1 (one) electronic copy of each original drawing submittal (specifically prepared for the project). Do not include MSDS documentation in any submittal. Architect will retain one (1) marked-up copy for his records and will return one (1) marked-up copy to the Contractor. One (1) set will go to the Owner.

b. Submit 1 (one) electronic copy (bound in single file) of hardware submittals, fixture schedules, manufacturers' data and all other submittals that have been prepared in an 11 inch by 17 inch or smaller format. The Architect will return 1 (one) reviewed set to the Contractor and copy of file to Owner

1) Upon receipt of his marked-up shop drawings/submittals, the Contractor shall make as many copies for distribution as he deems necessary, however he shall retain one copy to mark-up further to show any and all construction changes that modify the submittal in any form. This document(s) shall be turned over to the Owner at the end of the Project along with the Record Documents.

Color code: On all shop drawings submittals, schedules, etc., the Contractor's marks shall be in red, the Architect's in green and the Engineer's (if any involved) in blue. All comments shall be initialed by a responsible party within each organization.

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 appropriate Specification Section.

3. 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 not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. 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. Architect will return one submittal with options selected.

5. 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 two sets of Samples. Architect will retain one Sample set and one will be returned. Mark up returned Sample set as a Project Record Sample.

        1) Construct 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.

Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."

Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."

Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."

INFORMATIONAL SUBMITTALS

General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit one electronic copy of each submittal, unless otherwise indicated. Architect will not return copies.

2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."

Coordination Drawings: Comply with requirements specified in Division 1 Section "Project Management and Coordination."

Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

Installer Certificates: Prepare 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.

Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

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

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

Material Test Reports: Prepare 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.

Product Test Reports: Prepare written reports indicating 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.

Research/Evaluation Reports: Prepare 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.

Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."

Preconstruction Test Reports: Prepare 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.

Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, 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.

Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

Design Data: Prepare 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.

Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating

a product or equipment. Include name of product and name, address, and telephone number of manufacturers. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

Manufacturer's Field Reports: Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.

1. Architect will not review submittals that include MSDSs and will return the entire submittal for resubmittal.

DELEGATED DESIGN

Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

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

Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit one copy of a statement, 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

CONTRACTOR'S REVIEW

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.

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.

ARCHITECT'S ACTION

General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. REVIEWED–Indicates that reviewed submittal is satisfactory.

2. REJECTED–Indicates submittal is not satisfactory and another properly prepared submittal of same or another product must be prepared and resubmitted.

3. MAKE CORRECTIONS AS NOTED–Indicates submittal is satisfactory if the changes, modifications, notes, etc. marked by the Architect are made a part of the submittal.

4. REVISE AND RESUBMIT–Indicates although parts of the submittal are satisfactory, there are enough significant modifications that must be made to require the Contractor, subcontractor, supplier, and/or manufacturer to provide additional essential information to his submittal and then resubmit it to the Architect.

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

Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

Submittals not required by the Contract Documents may not be reviewed and may be discarded.

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SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -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, Owner's Representative and/or authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections include the following:

1. Division 1 Section "Special Conditions" for additional information and requirements regarding testing and inspecting allowances.

2. Section 01 73 29 "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.

3. Section 01 91 13 "General Commissioning Requirements" for additional information and requirements in support of Commissioning.

4. Divisions 2 through 32 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, Owner or Owner's Representative.

C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.

D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards and other standards and requirements indicated.

G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

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

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

1. Note: Owner's Testing Agency (or similar verbiage) shall refer to testing agency or laboratory selected and employed by the Owner.

J. 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. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of ten verifiable previous projects similar in size and scope to this Project (except where other specific requirements are indicated); being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. General: 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 uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding, with a copy to the Owner's Representative.

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, with a copy to the Owner's Representative.

1.5 SUBMITTALS

A. Qualification Data: 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.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.

2. Description of test and inspection.
3. Identification of applicable standards.
4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that 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.

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. Include copies in Closeout and Record Documents binders.

1.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Installer Qualifications: A firm or individual verifiably 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 verifiable record of successful in-service performance.

C. Manufacturer Qualifications: A firm verifiably experienced in manufacturing products or systems similar to those indicated for this Project and with a verifiable record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Fabricator Qualifications: A firm verifiably experienced in producing products similar to those indicated for this Project and with a verifiable record of successful in-service performance, as well as sufficient production capacity to produce required units.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is verifiably experienced in providing engineering and design services of the kind indicated. Engineering services are defined as those performed for design, installations of the system, assembly, or product, that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized and verifiably experienced experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

   1. Requirement for specialists shall not supersede building codes and regulations governing the Work.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the verifiable experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; 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. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is verifiably 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.

I. 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, mockups, and laboratory 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 the Owner's Representative, applicable Engineer or Consultant, and the Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. 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 or Owner's Representative.

2. Notify Architect and Owner's Representative at least 7 days in advance of dates and times when mockups will be constructed.

3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain Architect's and Owner's Representative's approval of mockups before starting work, fabrication, or construction.

   a. Allow 7 days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

6. Demolish and remove mockups when directed, unless otherwise indicated.

K. Laboratory Mockups (if any required): Comply with requirements of preconstruction testing and those specified in individual Sections in Divisions 2 through 16.

1.7 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 by the Owner, separate from the Contract.

   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.

   4. Refer to Division 1 Section "Special Conditions", General Conditions and individual specifications Sections for additional information and requirements.

B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. 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.

1. 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.

2. Notify testing agencies as early as possible, but no less than 48 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate to the Architect, of each quality-control service, with copies to the Owner's Representative and the appropriate Engineer and Consultant.

4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. 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 1 Section "Special Conditions" and as specified herein for all other documentation.

D. 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.

E. Testing Agency Responsibilities: Cooperate with Architect, Owner's Representative, and Contractor in performance of duties. Provide verifiably qualified personnel to perform required tests and inspections.

1. Notify Architect, Owner's Representative 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, with copies to the Architect, Owner's Representative and the appropriate Engineer and Consultant.

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.

F. 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.

G. 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.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work.

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

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency and/or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows, except as modified by Division 1 Section "Special Conditions";

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.

2. Notifying Architect, Owner's Representative 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 Owner's Representative, Contractor and to authorities having jurisdiction.

4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of any 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.

6. Retesting and re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. Refer to "Project Directory." The Owner may engage an additional qualified testing agency or agencies during the course of the Work of the project, and may allow the named testing agency to subcontract this work to other qualified testing agencies.

3.2 TEST AND INSPECTION LOG

A. 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, Owner's Representative and the applicable Engineer or Consultant.

4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's and Owner Representative'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. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

2. Comply with the Contract Document requirements for Section 01 73 29 "Cutting and Patching."

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 01 40 00

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SECTION 01 4100
STRUCTURAL TESTS AND SPECIAL INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements required for compliance with the International Building Code, Chapter 17, Structural Tests and Special Inspections.

B. Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with other construction 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 construction 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. The owner will engage one or more qualified special inspectors and / or testing agencies to conduct structural tests and special inspections specified in this section and related sections and as maybe specified in other divisions of these specifications.

D. Related Sections include but are not limited to the following:

1. 02 3000 EARTHWORK

2. 03 3000 CAST-IN-PLACE CONCRETE

3. 04 8100 UNIT MASONRY ASSEMBLIES

4. 05 1200 STRUCTURAL STEEL

5. 05 3100 STEEL DECK

6. 05 4000 COLD-FORMED METAL FRAMING

1.3 DEFINITIONS

A. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services when such agency has been approved by the building official.

B. Construction Documents: Written, graphic and pictorial documents prepared or assembled for describing the design, location, and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction Documents include all supplemental instructions, sketches, addenda, and revisions to the drawings and specifications issued by the registered design professional beyond those issued for a building permit.

C. Shop Drawings / Submittal Data: Written, graphic and pictorial documents prepared and / or assembled by the contractor based on the Construction Documents.

D. Structural Observation: Visual observation of the structural system by a representative of the registered design professional's office for general conformance to the approved construction documents. Structural observations are not considered part of the structural tests and special inspections and do not replace inspections and testing by the testing agency or special inspector.

E. Special Inspector: A qualified person who demonstrating competence, to the satisfaction of the code enforcement official and registered design professional in responsible charge, for inspection of the particular type of construction or operation requiring special inspection. The special inspector shall be a licensed professional engineer or engineering intern or a qualified representative from the testing agency.

F. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

G. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.

H. Testing Agency: A qualified materials testing laboratory under the responsible charge of a licensed professional engineer, approved by the code enforcement official and the registered design professional in responsible charge, to measure, examine, test, calibrate, or otherwise

determine the characteristics or performance of construction materials and verify confirmation with construction documents.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Minimum qualifications of inspection and testing agencies and their personnel shall comply with ASTM E329-03 Standard Specification for Agencies in the Testing and / or Inspection of Materials Used in Construction.

   a. Inspectors and individuals performing tests shall be certified for the work being performed as outlined in the appendix of the ASTM E329. Certification by organizations other than those listed must be submitted to the building official for consideration before proceeding with work.

2. In addition to these requirements, local jurisdiction may have additional requirements. It is the responsibility of the testing and inspection agencies to meet local requirements and comply with local procedures.

1.5 CONFLICTING REQUIREMENTS, REPORTS, AND TEST RESULTS

A. General: 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 uncertainties and requirements that are different, but apparently equal, to the registered design professional in responsible charge 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 the registered design profession in responsible charge for a decision before proceeding.

C. The special inspector's reports and testing agencies results shall have precedence over reports and test results provided by the contractor.

D. Where a conflict exists between the construction documents and approved shop drawings / submittal data, the construction documents shall govern unless the shop drawings / submittal data are more restrictive. All conflicts shall be brought to the attention of the registered design professional in responsible charge.

1.6 SUBMITTALS BY SPECIAL INSPECTOR AND / OR TESTING AGENCY

A. Special inspectors shall keep and distribute records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge, contractor, architect, and owner. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.

1. Special inspection reports and test results shall include, but not be limited to, the following:

a. Date of inspection.

b. Description of inspections or tests performed including location (reference grid lines, floors, elevations, etc.).

c. Statement noting that the work, material, and / or product conforms or does not conform to the construction document requirements.

1) Name and signature of contractor's representative who was notified of work, material, and / or products that do not meet the construction document requirements.

d. Name and signature of special inspector and / or testing agency representative performing the work.

B. Schedule of Non-Compliant Work: Each agent shall maintain a log of work that does not meet the requirements of the construction documents. Include reference to original inspection / test report and subsequent dates of re-inspection / retesting.

C. Reports and tests shall be submitted within 1 week of inspection or test. Schedule of Non-Compliant Work shall be updated daily and submitted at monthly intervals.

D. Final Report of Special Inspections. Submitted by each agent listed in the schedule of Structural Testing and Special Inspections.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY

A. The contractor shall coordinate the inspection and testing services with the progress of the work. The contractor shall provide sufficient notice to allow proper scheduling of all personnel. The contractor shall provide safe access for performing inspection and on site testing.

B. The contractor shall submit schedules to the owner, registered design professionals and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.

C. Each contractor responsible for the construction of a seismic-force-resisting system, designated seismic system, or component listed in the quality assurance plan shall submit a written contractor's statement of responsibility to the building official and to the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgment of awareness of the special requirements contained in the quality assurance plan.

2. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official.

3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.

4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

D. Each contractor responsible for the construction of a main windforce-resisting system or a wind-resisting component listed in the quality assurance plan shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgment of awareness of the special requirements contained in the quality assurance plan.

2. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official.

3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports.

4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

E. The contractor shall repair and / or replace work that does not meet the requirements of the construction documents.

1. Contractor shall engage an engineer / architect to prepare repair and / or replacement procedures.

2. Engineer / architect shall be registered in the state in which the project is located. Engineer shall be acceptable to the registered design professional in responsible charge, code enforcement official, and owner.

3. Procedures shall be submitted for review and acceptance by the registered design professional in responsible charge, code enforcement official, and owner before proceeding with corrective action.

F. The contractor shall be responsible for costs of:

1. Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the construction documents and shop drawings / submittal data.

2. Review of proposed repair and / or replacement procedures by the registered design professional in responsible charge and the inspectors and testing agencies.

3. Repair or replacement of work that does not meet the requirements of the construction documents.

3.2 STRUCTURAL OBSERVATIONS

A. Structural observations may be made periodically as determined by the registered design professional in responsible charge.

3.3 TESTING AND INSPECTION

A. Testing and inspection shall be in accordance with the attached Schedule of Special Inspections.

B. Reference related specifications for the minimum level of inspections and testing. Provide additional inspections and testing as necessary to determine compliance with the construction drawings.

PART 4 - SCHEDULES AND FORMS (ATTACHED)

4.1 STATEMENT OF SPECIAL INSPECTIONS.

4.2 SCHEDULE OF SPECIAL INSPECTIONS.

4.3 FINAL REPORT OF SPECIAL INSPECTIONS.

END OF SECTION 01 41 00

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FINAL REPORT OF SPECIAL INSPECTIONS

Project:

Project Address:

Testing / Inspection Agent:

Testing / Inspection Agent Address:

Scope of Testing / Inspections:

To the best of my information, knowledge, and belief, the special inspections or testing required for this project, and designated for this Agent in the *Schedule of Special Inspections* submitted for permit, have been completed in accordance with the contract documents.

Interim reports submitted prior to this final report and numbered to - , form a basis for, and are to be considered an integral part of this final report.

Special Inspector's Seal

(Licensed Professional Engineer)

Prepared By:

Type or print name

Signature Date

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Required Special Inspections

Project Name_____ **Project Address**_____

During construction of the referenced project, it is intended that special inspection as outlined in Chapter 17 of the 2018 International Building Code be provided for by the owner. The following areas of work will require special inspection:

MATERIAL / ACTIVITY	FREQUENCY OF INSPECTION	INSPECTOR
A. Inspection of Steel Fabrication Process per 1704.2.5.1 (Not required if fabricator is registered and approved per Section 1704.2.5.2)	Periodic	Testing Agent
B. Inspection of Steel per 1705.2 (in accordance with quality assurance inspection requirements of AISC 360).		
1. Inspection of welding:		
a. Prior to welding:		
1. Welding procedure specifications available	Continuous	Testing Agent
2. Manufacturer certifications for welding consumables available	Continuous	Testing Agent
3. Material identification (type/grade)	Periodic	Testing Agent
4. Welder identification system	Periodic	Testing Agent
5. Fit-up of groove welds (including joint geometry)	Periodic	Testing Agent
6. Configuration and finish of access holes	Periodic	Testing Agent
7. Fit-up of fillet welds	Periodic	Testing Agent
b. During welding:		
1. Use of qualified welders	Periodic	Testing Agent
2. Control and handling of welding consumables	Periodic	Testing Agent
3. No welding over cracked welds	Periodic	Testing Agent
4. Environmental conditions	Periodic	Testing Agent
5. Welding specification procedure followed	Periodic	Testing Agent
6. Welding Techniques	Periodic	Testing Agent
c. After welding:		
1. Welds cleaned	Periodic	Testing Agent
2. Size, length, and location of welds	Continuous	Testing Agent
3. Welds meet visual acceptance criteria	Continuous	Testing Agent
4. Arc strikes	Continuous	Testing Agent
5. K-area	Continuous	Testing Agent
6. Backing removed and weld tabs removed	Continuous	Testing Agent
7. Repair activities	Continuous	Testing Agent
8. Document acceptance or rejection of welded joint or member	Continuous	Testing Agent
2. Inspection of high-strength bolting:		
a. Prior to bolting:		
1. Manufacturer's certifications available	Continuous	Testing Agent
2. Fasteners marked in accordance with ASTM requirements	Periodic	Testing Agent
3. Proper fasteners selected for the joint detail	Periodic	Testing Agent
4. Proper bolting procedure for the joint detail	Periodic	Testing Agent
5. Connecting elements meet applicable requirements	Periodic	Testing Agent

6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used	Periodic	Testing Agent
7. Proper storage provided for bolts, nuts, washers, and other fastener components	Periodic	Testing Agent
b. During bolting:		
1. Fastener assemblies placed in all holes and washers (if required) are positioned as required	Periodic	Testing Agent
2. Joint brought to the snug-tight condition prior to the pretensioning operation	Periodic	Testing Agent
3. Fastener component not turned by the wrench prevented from rotating	Periodic	Testing Agent
4. Fasteners are pretensioned in accordance with the RCSC specification progressing systematically from the most rigid point toward the free edges	Periodic	Testing Agent
c. After bolting:		
1. Document acceptance of rejection of bolted connections	Continuous	Testing Agent
3. Steel construction other than structural steel per 1705.2.2:		
a. Material verification of cold-formed steel deck:		
1. Identification markings to confirm to ASTM standards specified in the approved construction documents	Periodic	Testing Agent
2. Manufacturer's certified test reports	Periodic	Testing Agent
b. Inspection of welding:		
1. Cold-formed steel deck:		
a. Roof deck welds	Periodic	Testing Agent
2. Reinforcing steel:		
a. Verification of weldability of reinforcing steel other than ASTM A706	Periodic	Testing Agent
b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement	Continuous	Testing Agent
c. Shear reinforcement	Continuous	Testing Agent
d. Other reinforcing steel	Periodic	Testing Agent

MATERIAL / ACTIVITY	FREQUENCY OF INSPECTION	INSPECTOR
C. Inspection of Concrete per 1705.3 – 1705.3.1 & Table 1705.3		
1. Inspection of reinforcing steel, including placement.	Periodic	Testing Agent
2. Inspection of reinforcing steel welding in accordance with Table 1705.2.2, Item 2b.	--------	--------
3. Inspection of anchors cast in concrete where allowable loads have been increased, or where strength design has been used.	Periodic	Testing Agent
4. Inspection of anchors post-installed in hardened concrete members.	Periodic	Testing Agent
5. Verifying use of required design mix.	Periodic	Testing Agent
6. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Continuous	Testing Agent
7. Inspection of concrete placement for proper application techniques.	Continuous	Testing Agent
8. Inspection for maintenance of specified curing temperature and techniques.	Periodic	Testing Agent
9. Verification of in-situ concrete strength prior to removal of shores and forms from beams and structural slabs.	Periodic	Testing Agent
10. Inspect formwork for shape, location, and dimensions of the concrete member being formed.	Periodic	Testing Agent

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Required Special Inspections

MATERIAL / ACTIVITY	FREQUENCY OF INSPECTION	INSPECTOR
D. Inspection of Masonry per 1705.4 (Level "B" in accordance with TMS 402/ACI 530/ASCE 5 and TMS 602/ACI 530.1/ASCE 6 quality assurance program requirements)		
1. Verify compliance with approved submittals	Periodic	Testing Agent
2. Verification of f'_m and f'_{aac} prior to construction except where specifically exempted by code.	Periodic	Testing Agent
3. Verification of slump flow and visual stability index (VSI) as delivered to the project site in accordance with specification article 1.5 B.1.b.3 for self-consolidating grout.	Continuous	Testing Agent
4. As masonry construction begins, verify that the following are in compliance:		
a. Proportions of site-prepared mortar.	Periodic	Testing Agent
b. Construction of mortar joints.	Periodic	Testing Agent
c. Grade and size of prestressing tendons and anchorages.	Periodic	Engineer of Record
d. Location of reinforcement, connectors, and prestressing tendons and anchorages.	Periodic	Engineer of Record
e. Prestressing technique.	Periodic	Testing Agent
f. Properties of thin-bed mortar for AAC masonry.	Continuous	Testing Agent
5. Prior to grouting, verify that the following are in compliance:		
a. Grout space.	Periodic	Testing Agent
b. Grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.	Periodic	Testing Agent
c. Placement of reinforcement and connectors and prestressing tendons and anchorages.	Periodic	Engineer of Record
d. Proportion of site-prepared grout and prestressing grout for bonded tendons.	Periodic	Testing Agent
e. Construction of mortar joints.	Periodic	Testing Agent
6. Verify during construction:		
a. Size and location of structural elements.	Periodic	Testing Agent
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.	Periodic	Testing Agent
c. Welding of reinforcement.	Continuous	Testing Agent
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).	Periodic	Testing Agent
e. Application and measurement of prestressing force.	Continuous	Testing Agent
f. Placement of grout and prestressing grout for bonded tendons is in compliance.	Continuous	Testing Agent
g. Placement of AAC masonry units and construction of thin-bed mortar joints.	Continuous	Testing Agent
7. Observe preparation of grout specimens, mortar specimens, and/or prisms.	Periodic	Testing Agent

MATERIAL / ACTIVITY	FREQUENCY OF INSPECTION	INSPECTOR
E. Inspection of Soil Conditions per 1705.6		
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Periodic	Testing Agent
2. Verify excavations are extended to proper depth and have reached proper material.	Periodic	Testing Agent
3. Perform classification and testing of compacted fill materials.	Periodic	Testing Agent
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	Continuous	Testing Agent
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.	Periodic	Testing Agent

STATEMENT OF SPECIAL INSPECTIONS

Project:

Project Address:

Permit Applicant:

Applicant Address:

Owner:

Owner Address:

Registered Design Professionals (RDP):

Architect:

Geotechnical Engineer:

Structural Engineer:

Mechanical Engineer:

Electrical Engineer:

This statement of special inspections is submitted as a condition for permit issuance in accordance with Chapter 17 of the International Building Code. It includes a *Schedule of Special Inspections* applicable to the above referenced project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections.

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the building official and to the registered design professional in responsible charge at a frequency agreed upon by the permit applicant and building official prior to the start of work. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and the registered design professional in responsible charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted by each agent at the completion of that phase of work.

Maximum frequency of interim report submittals shall not be less than_____.

The Special Inspection program does not relieve the contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Owner's Acknowledgement:

_____

Signature Date

Building Official's Acceptance:

_____

Signature Date

_____

Permit No.

Frequency of interim report submittals to building official:

☐ Monthly ☐ Bi-Monthly ☐ Upon Completion ☐ Per Attached Schedule

RDP in Responsible Charge

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SECTION 01 42 00

REFERENCES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities, several of the more commonly referenced are listed below. If Contractor is unfamiliar with abbreviations referenced, he may contact the Architect who has all of the referenced names, telephone numbers and web sites on file in his office. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
ACI	ACI International (American Concrete Institute)	(248) 848-3700

	www.aci-int.org	
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800)843-2763 (973) 882-1170
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSI	Cast Stone Institute www.caststone.org	(717) 272-3744
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200

NFPA	NFPA (National Fire Proctection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.com	(901) 526-5016
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
ADAAG	Americans with Disabilities Act (ADA)	(800) 872-2253

C. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

END OF SECTION 01 42 00

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DEFINITIONS:

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.

C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Architect," "requested by the Architect," and similar phrases.

D. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

G. Install: The term "install" is used to describe operations at project site including the actual "unloading, temporary storage, unpacking, assembly, erection,

placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

I. Installer:

1. An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

2. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

3. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land on which the Project is to be built.

1. If areas available are not indicated, they will be as mutually agreed by Owner and Contractor at Preconstruction Conference and as modified during construction.

K. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 50 Division format and MASTERFORMAT 2014 numbering system.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases

when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language:

   a. Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.

2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS:

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

C. Conflicting Requirements:

   1. Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to the Architect for a decision before proceeding.

   2. 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. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.

D. Copies of Standards:

1. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

1.5 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition.

B. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, these symbols are supplemented by more specific symbols as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect/Engineer for clarification before proceeding.

1.6 SUBMITTALS:

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 PRODUCTS: Not Applicable.

PART 3 EXECUTION: Not Applicable.

END OF SECTION 01 42 19

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Section 01 11 00 "Summary of Work" for limitations on utility interruptions and other work restrictions.

2. Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.

3. Section 01 70 00 "Execution and Closeout Requirements" for progress cleaning requirements.

4. Divisions 2 through 28 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities

without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Sewer connections will not be in place for most if not all of the duration of the project. When and if the off-site sewer is installed by others and sewer piping under this contract is installed, should the contractor decide to connect to the sewer he must pay all sewer use charges until the project is turned over to the Owner.

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

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

1.5 SUBMITTALS

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

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.

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall 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 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 construction personnel. Keep 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 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack board.

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 degrees F.

6. Lighting fixtures capable of maintaining average illumination of 20 fc 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.

2.2 EQUIPMENT

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

B. HVAC Equipment: 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 testing agency acceptable to authorities having jurisdiction, and marked for intended use.

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.

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

2. Connect temporary sanitary sewer from construction office to a submerged temporary holding tank, as directed by authorities having jurisdiction.

3. Provide erosion control structures to drain storm water from site.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction from existing water lines in the street. Contractor shall pay for any metering costs and associated fees required by the City Water Department.

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

D. 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.

E. 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.

F. Electric Power Service: Provide temporary electric meter power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Contractor shall be responsible for any charges associated with said service.

1. Install electric power service overhead, unless otherwise indicated.

G. 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.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.

1. Provide additional telephone lines for the following:

a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.

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. Architect's office.

e. Engineers' offices.

f. Owner's office.

g. Principal subcontractors' field and home offices.

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

I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities, or other suitable high-speed internet connection.

1. Provide DSL in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area with good visibility of construction. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. 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.

C. 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 nor endanger permanent Work or temporary facilities.

D. Project Identification and Temporary Signs: Erect Project identification, General Contractor's sign, Architect's sign and other signs as approved. Install signs where directed to inform public and individuals seeking entrance to Project. Subcontractor signs are not permitted.

E. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Construction Waste Management."

F. 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 Division 1 Section "Execution Requirements" for progress cleaning requirements.

G. Temporary Stairs: Until permanent stairs are available, provide one temporary stair between floors, located near the center of the building.

H. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that 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 Section 01 11 00 "Summary of Work."

B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 31 Section "Site Clearing."

C. Storm water Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of storm water from heavy rains.

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

E. 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 not complete, insulate temporary enclosures.

F. 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.

   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 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in 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. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when 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. Carefully remove and turn over Architect's sign to the Architect.

   2. Where area is intended for landscape development, in an area that has been used as a compacted temporary road bed, remove soil and aggregate fill that do not comply with requirements for landscaping 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, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and equal products.

B. Related Sections include the following:

1. Section 01 42 00 "References" for applicable industry standards for products specified.

2. Section 01 77 00 "Closeout Procedures" for submitting warranties for Contract closeout.

3. Divisions 2 through 32 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3. Equal Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating equal products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.

2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.

b. Generic name used in the Contract Documents.

c. Proprietary name, model number, and similar designations.

d. Manufacturer's name and address.

e. Supplier's name and address.

f. Installer's name and address.

g. Projected delivery date or time span of delivery period.

h. Identification of items that require early submittal approval for scheduled delivery date.

3. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.

4. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified materials or products cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. Form of Acceptance: Change Order.

   b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

   c. If Contractor's Substitution Requests are repeatedly (i.e. 3 times) submitted incomplete, i.e., no definitive response to items "a" through "l", the Architect will not consider any further Substitution Requests.

Equal Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of an equal product request. Architect will notify Contractor of approval or rejection of proposed equal product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

   a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."

b. Use product specified if Architect cannot make a decision on use of an equal product request within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store materials in a manner that will not endanger Project structure.

3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Store cementitious products and materials on elevated platforms.

5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

7. Protect stored products from damage and liquids from freezing.

8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

9. Materials Stored Off Site: Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

    a. The contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the offsite location.

    b. A Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party.

    c. The Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner.

    d. The materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner.

    e. Compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.

2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

Warranty start for mechanical and electrical equipment being date of substantial completion.

D. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.

5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.

6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.

7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Equal Products" Article to obtain approval for use of an unnamed product.

E. Product Selection Procedures:

1. Products and Manufacturers: In particular instances there may only be a single product or manufacturer appropriate for use on the project, in which case where Specifications name a single product and manufacturer and say “no equal”, provide the named product.

2. Products and Manufacturers: When one or two products or manufacturers are specified and have the words “or approved equal”, the Contractor may propose to provide alternatives in the form of a Substitution Request which once reviewed by the Architect will be either accepted or rejected. If Substitution Request is submitted for approval 7 days prior to the receipt of bids and approved by the Architect, said approvals will be included in Addenda. Only those Substitution Requests listed as approved in Addenda may bid the project.

3. Products and Manufacturers: Where Specifications include a list of three (3) or more names of both products and manufacturers, provide one of the products listed that complies with requirements. No substitutions will be accepted.

4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or an equal product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.

5. Visual Matching Specification: Where Specifications require matching an established Sample, product must comply with all requirements and must match Architect's sample. Architect's decision will be final on whether a proposed product matches.

a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

   a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.

   b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

1.8 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution under the conditions set forth in this section under Product Selection Procedures, if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution under the conditions set forth in this section under Product Selection Procedures and when the following conditions are satisfied. If the following conditions are not satisfied,

C. Architect will return requests without action, except to record noncompliance with these requirements:

   1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

   2. Requested substitution requires no or only very minor revisions (as determined by the Architect), to the Contract Documents.

   3. Requested substitution is consistent with the Contract Documents and will produce indicated results.

   4. Substitution request is fully documented and properly submitted.

5. Requested substitution will not adversely affect Contractor's Construction Schedule.

6. Requested substitution has received necessary approvals of authorities having jurisdiction.

7. Requested substitution is compatible with other portions of the Work.

8. Requested substitution has been coordinated with other portions of the Work.

9. Requested substitution provides specified warranty.

10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

END OF SECTION 01 60 00

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Section 01 31 00 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Section 01 33 00 "Submittal Procedures" for submitting surveys.
3. Section 01 77 00 "Closeout Procedures" for submitting Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 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. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by professional engineer.

1.4 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.

PART 2 – EXECUTION

2.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities 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; and underground electrical services.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

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

    a. Description of the Work.

    b. List of detrimental conditions, including substrates.

    c. List of unacceptable installation tolerances.

    d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

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

2.2 PREPARATION

A. 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.

B. 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.

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of

problem encountered, together with recommendations for changing the Contract Documents. Submit requests on RFI, "Request for Interpretation."

2.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a professional engineer 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 dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.

5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and 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.

2.4 FIELD ENGINEERING

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

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

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

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

2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. 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 site work.

D. Final Property Survey: Submit a final property survey certifying exact locations of site improvements including building(s), parking lots, roadways and utilities including structure elevations, top and invert, distances from property lines, and with any variation from the original civil staking and layout and utility drawings identified.

2.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling unless shown otherwise on drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. 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.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

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.

H. 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.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

2.6 OWNER-INSTALLED PRODUCTS

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

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

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 forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

2.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

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: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation,

comply with qualification requirements in Division 1 Section "Quality Requirements."

2.9 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 manufacturer's written instructions for temperature and relative humidity.

2.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 70 00

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SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definition:

1. "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

2. "Cutting and patching" is performed for coordination of the Work, to uncover work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.

3. Cutting and patching performed during the manufacture of products, or during the initial fabrication, erection or installation processes is not considered to be "cutting and patching" under this definition. Drilling of holes to install fasteners and similar operations are also not considered to be "cutting and patching".

1.3 SUBMITTALS:

A. Procedural Proposal for Cutting and Patching:

1. Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as application, in the submittal.

2. Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.

3. List products to be used and firms that will perform work.

4. Give dates when work is expected to be performed.

5. List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that work be out-of-service temporarily. Indicate how long utility service will be disrupted.

6. Approval by the Architect/Engineer to proceed with cutting and patching work does not waive the Architect/Engineer's right to later require complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General: Except as otherwise indicated, or as directed by the Architect/Engineer, use materials for cutting and patching that are identical to specified materials. If identical materials are not available, or cannot be used, use materials that match adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

PART 3 - EXECUTION

3.1 INSPECTION:

A. Before cutting, examine the surfaces to be cut and patched and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding with the work.

3.2 PREPARATION:

A. Temporary Support: To prevent failure provide temporary support of work to be cut.

B. Protection:

1. Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions for that part of the project that may be exposed during cutting and patching operations.

2. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3. Take precautions not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.3 PERFORMANCE:

A. General: Employ skilled workmen to perform cutting and patching work. Except as otherwise indicated or as approved by the Architect/Engineer, proceed with cutting and patching at the earliest feasible time and complete work without delay.

B. Cutting:

1. Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

2. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut through concrete and masonry using a cutting machine such as a carborundum saw or core drill to insure a neat hole. Cut holes and slots neatly to size required with minimum disturbance of adjacent work. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Temporarily cover openings when not in use.

C. Patching:

1. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work.

2. Where feasible, inspect and test patched areas to demonstrate integrity of work.

3. Restore exposed finishes of patched areas and where necessary extend finish restoration into retained adjoining work in a manner which will eliminate evidence of patching and refinishing.

4. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coat.

5. Patch, repair or rehang existing ceilings as necessary or called for on plans to provide an even plane surface of uniform appearance.

3.4 CLEANING:

A. Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely point, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.

2. Warranties.

3. Final cleaning.

B. Related Sections include the following:

1. Section 00 72 13 "General Conditions" for requirements for Applications for Payment for Substantial and Final Completion.

2. Section 01 70 00 "Execution and Closeout Requirements" for progress cleaning of project site.

4. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

5. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

6. Section 01 79 00 "Demonstration and Training" for requirements for instructing Owner's personnel.

7. Divisions 2 through 32 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.

2. Advise Owner of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.

6. Deliver spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.

9. Submit test/adjust/balance records.

10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

11. Advise Owner of changeover in heat and other utilities.

12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

13. Complete final cleaning requirements, including touchup painting.

14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

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

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."

2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report and warranty.

5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

A. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

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

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Mark the Architect's punch list so as to identify those items that are still outstanding and uncorrected at the time of submission.

1.6 WARRANTIES

A. Submittal Time: 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.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch 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 Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

4. Provide (1) one copy of each warranty in digital format (pdf) on a cd or other approved digital storage device.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

3.1 FINAL CLEANING

A. General: Provide 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 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. 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.

   f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

   g. Sweep concrete floors broom clean in unoccupied spaces.

   h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

   i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision obscuring materials. Replace chipped or broken glass and other

damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

j. Remove labels that are not permanent.

k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

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. Replace parts subject to unusual operating conditions.

n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

p. Clean ducts, blowers, and coils if units were operated without filters during construction.

q. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

r. Leave Project clean and ready for occupancy.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 77 00

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This 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. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

B. Related Sections include the following:

1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

2. Section 01 77 00 "Closeout Procedures" for submitting operation and maintenance manuals.

3. Section 01 78 39 "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.

4. Divisions 2 through 32 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 SUBMITTALS

A. Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit three copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 – PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.

2. List of systems.

3. List of equipment.

4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

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: Enclose title page in transparent plastic sleeve. 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, address, and telephone number of Contractor.

6. Name and address of Architect.

7. 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 comprehensive table of contents for all volumes in each volume of the set.

B. 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.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

   a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

   b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. 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 diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.

5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

   a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.

   b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

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.

A. 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.

B. 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.

C. 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.

2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
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 MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross reference Specification Section number and title in Project Manual.

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 MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.

3. Identification and nomenclature of parts and components.

4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.

2. Troubleshooting guide.

3. Precautions against improper maintenance.

4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

5. Aligning, adjusting, and checking instructions.

6. Demonstration and training videotape, 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: Some equipment and products require maintenance by the manufacturer, supplier or subcontractor, i.e., an authorized service representative, as part of the warranty. The General Contractor shall ensure that said maintenance work is done and provide copies of service reports to the Owner.

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 Record Drawings in Division 1 Section "Project Record Documents."

G. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

H. Contractor must submit O&M data digitally.

END OF SECTION 01 78 23

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY:

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.

2. Record Specifications.

3. Record Product Data.

B. Related Sections include the following:

1. Section 01 77 00 "Closeout Procedures" for general closeout procedures.

2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

3. Divisions 2 through 32 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS:

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints.

2. Provide (1) one copy of scanned record documents on disc or USB device

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one copy of each Product Data submittal.

D. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one clean set of blue- or black-line white prints of the Contract Drawings and Shop Drawings and one copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.

B. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

   a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

   b. Accurately record information in an understandable drawing technique.

   c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

C. Content: Types of items requiring marking include, but are not limited to, the following:

   a. Dimensional changes to Drawings.

   b. Revisions to details shown on Drawings.

   c. Depths of foundations below first floor.

   d. Locations and depths of underground utilities.

   e. Revisions to routing of piping and conduits.

   f. Revisions to electrical circuitry.

   g. Actual equipment locations.

   h. Duct size and routing.

i. Locations of concealed internal utilities.

j. Changes made by Change Order or Construction Change Directive. (Posted on Documents.)

k. Changes made following Architect's written orders, i.e. ASIs. (Posted on Documents.)

l. Details not on the original Contract Drawings. (Posted on Documents.)

m. Field records for variable and concealed conditions.

n. Record information on the Work that is shown only schematically.

o. Changes made in response to Contractor's questions, i.e. RFIs. (Posted on Documents.)

D. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.

E. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

F. Mark important additional information that was either shown schematically or omitted from original Drawings.

G. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable. Where posting is required, post on Drawing Set and in Specifications on sheets or pages adjacent to or on top of where modification applies. Attachment method shall be taped at top only, so as to access original underneath.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications. Maintain one clean copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal. Maintain one clean set at the job site for the sole purpose of recording changes to the drawings and specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Specifications and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3- RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for

construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours. Architect's representative will review Record Documents with the project superintendent each month to determine to his satisfaction whether or not Record Documents are being kept up to date. Failure to do so will result in the delay of processing pay request until Record Documents are brought up to date.

C. Contractor must submit Record As-Built drawings digitally and upload to E-Builder.

END OF SECTION 01 78 39

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SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.

2. Training in operation and maintenance of systems, subsystems, and equipment.

3. Demonstration and training videotapes.

B. Related Sections include the following:

1. Section 01 31 00 "Project Management and Coordination" for requirements for preinstruction conferences.

2. Divisions 2 through 32 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one complete training manual for Owner's use.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 – PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

PART 3 – EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Instructor: Engage a qualified instructor to prepare instruction program and training modules, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Instructor shall demonstrate to Owner's personnel how to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain systems. **Video record all training sessions. Three (3) copies of each session, in DVD format, shall be submitted to the owner.**

D. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

   1. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 01 79 00

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SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. OPR and BoD documentation are included by reference for information only.

1.2 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components. B. Related Sections:

1. Division 01 Section "Facilities Exterior Enclosure Commissioning" for commissioning process activities for building exterior enclosure, roof, and foundation systems, assemblies, equipment, and components.

2. Division 01 Section "Interiors Commissioning" for commissioning process activities for building interiors construction, stairways, and finish systems and assemblies.

3. Division 14 Section "Commissioning of Conveying Equipment" for commissioning process activities for conveying systems, assemblies, equipment, and components.

4. Division 21 Section "Commissioning of Fire Suppression" for commissioning process activities for fire-suppression systems, assemblies, equipment, and components.

5. Division 22 Section "Commissioning of Plumbing" for commissioning process activities for plumbing systems, assemblies, equipment, and components.

6. Division 23 Section "Commissioning of HVAC" for commissioning process activities for HVAC&R systems, assemblies, equipment, and components.

7. Division 25 Section "Commissioning of Integrated Automation" for commissioning process activities for integrated automation systems, assemblies, equipment, and components.

8. Division 26 Section "Commissioning of Electrical Systems" for commissioning process activities for electrical systems, assemblies, equipment, and components.

9. Division 27 Section "Commissioning of Communications" for commissioning process activities for communications systems, assemblies, equipment, and components.

10. Division 28 Section "Commissioning of Electronic Safety and Security" for commissioning process activities for electronic safety and security systems, assemblies, equipment, and components.

1.3 DEFINITIONS

A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. C. CxA: Commissioning Authority.

C. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

D. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA. B. Members Appointed by Owner:

1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract. CxA shall be a third-party qualified professional with experience in building commissioning. CxA shall be certified as a commissioning agent.

2. Representatives of the facility user and operation and maintenance personnel.

3. Architect and engineering design professionals.

1.5 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and each Contractor for information and use.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BoD documentation, prepared by Architect and approved by Owner, to the CxA and each Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.6 EACH CONTRACTOR'S RESPONSIBILITIES

A. Each Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.

2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.

3. Attend commissioning team meetings held on a biweekly basis.

4. Integrate and coordinate commissioning process activities with construction schedule.

5. Review and accept construction checklists provided by the CxA.

6. Complete electronic construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.

7. Review and accept commissioning process test procedures provided by the Commissioning Authority.

8. Complete commissioning process test procedures.

1.7 CxA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan.

C. Convene commissioning team meetings.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Verify the execution of commissioning process activities using random sampling. The sampling rate may vary from 1 to 100 percent. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log. F. Prepare and maintain the Issues Log.

F. Prepare and maintain completed construction checklist log.

G. Witness systems, assemblies, equipment, and component startup.

H. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 91 13

SECTION 02 32 00
GEOTECHNICAL INVESTIGATION

PART 1 - GENERAL

SCOPE

This section provides information resulting from subsurface investigations completed at the site as part of this project. This section may contain information applicable to ALL sitework, and other technical specification sections, as well. All Contractors are expected to review this information as part of their duties to familiarize themselves with the site.

Results of the geotechnical investigation apply only to the locations at which data was collected, at the specific time it was collected. Geotechnical conditions may differ elsewhere on the site.

Prior to making additional investigations of his own using test pits, borings, or other methods; Bidder shall first gain permission from property owner and Owner's Project Manager. Geotechnical investigations completed by Bidder shall comply with all applicable requirements of Division 01 through Division 33 of this project.

RELATED WORK

Applicable provisions of Division 01 govern work under this Section.

PART 2 - MATERIALS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 02 32 00

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DECEMBER 20, 2022

REPORT OF SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION FOR

Irondale Library

1032 Grants Mill Road Birmingham, Alabama

BECC Project Number: 222119

PREPARED FOR:

Sain Associates, Inc.

c/o Mr. Darren Hamrick, P.E.

Two Perimeter Park South, Suite 500 East

Birmingham, AL 35243

GEOTECHNICAL, MATERIALS, AND ENVIRONMENTAL ENGINEERS

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Principal Geotechnical Engineer

December 20, 2022

Mr. Darren Hamrick, P.E.
Sain Associates, Inc.
Two Perimeter Park South, Suite 500 East
Birmingham, AL 35243

Subject: Report of Subsurface Exploration and Geotechnical Engineering Evaluation for Irondale Library
Irondale, Alabama
BECC Project Number: 222119

Dear Mr. Hamrick:

BECC has completed the authorized Subsurface Exploration and Geotechnical Engineering Evaluation for the subject project. This work was conducted in accordance with the "Consultant Contract for Services" between Sain and BECC dated November 10, 2022.

The purpose of our work was to determine the general soil conditions and to provide site preparation, foundation design and pavement design for the new Irondale Library in Irondale, Alabama. This report outlines the exploration procedures used, exhibits the data obtained, and presents our conclusions and recommendations.

We sincerely appreciate the opportunity to have worked with you on this project. If you have any questions, or if we may be of further service to you, please call us.

Respectfully submitted,
BECC, Inc.

Richard A. Rhinehart

Richard A. Rhinehart, P.E.
Principal Geotechnical Engineer

EXECUTIVE SUMMARY

The project will consist of a new Irondale Library in Irondale, Alabama. The following is a summary of the exploration including our findings, conclusions, and recommendations. Refer to subsequent sections within the text for detailed discussions of these topics.

- The proposed site had an approximately 1.5-acre pond located on the northern portion of the site that was subsequently filled in. Six additional soil test borings were drilled at the site to depths of 7 to 23 feet below the existing ground surface. Existing fill soils were encountered in the borings and extended to approximately 3 to 23 feet below the existing grades. The existing fill soils typically consisted of medium stiff, sandy to silty clay and very loose to medium dense, silty to clayey sand. Residual soils were encountered below the existing fill soils and consisted of medium dense to very dense, silty sand and medium stiff, sandy, and silty clay. The residual soils extended to depths of approximately 6 to 15 feet below the ground surface. Decomposed rock was typically at the base of the residual soils. Auger refusal (hard rock) was encountered in the borings from 7 to 23 feet below the existing surface. Groundwater was not encountered at the time of drilling.

- We recommend **all** of the existing fill soils within 10 feet of new building area be undercut completely and replaced with new compacted structural fill. Non-structural areas such as parking lots and roadways can be stabilized by partially undercutting (6 feet) and replacement with recompacted controlled structural fill (per section 7.3 of this report). We anticipate that the soils undercut can be stockpiled and reused as controlled structural fill.

- New engineered fill, if required, should be compacted to a minimum of 98% of the Standard Proctor maximum dry density (ASTM D698) at a moisture content within 2% of the soil's optimum moisture content.

- We recommend permanent cut and fill slopes be no steeper than 2(H): 1(V) in compacted fill soils or residual soils.

- It is our opinion the building can be designed for support using conventional spread foundation bearing in the existing stiff residual soils or controlled structural fill. We recommend a maximum allowable bearing pressure of 2,500 psf.

- It is our opinion that the floor slab for the building can be built on-grade, achieving support from recompacted on-site stiff soils or new controlled structural fill.

- The recommended pavement section is 2" asphalt with 6" of crushed stone base for car parking areas and 3" asphalt with 6" of crushed stone base for driveways and pavement subjected to garbage truck traffic.

NOTE: *It should be noted that this executive summary presents selected elements of our findings and recommendations* ***only.*** *It* ***does not*** *present crucial details needed for the proper application of our findings and recommendations. Our findings, recommendations, and application are related* ***only through the full report****, and are best evaluated with the active participation of the geotechnical engineer who developed them.*

Table of Contents

SECTION 1: SCOPE OF WORK 1
SECTION 2: PROJECT DESCRIPTION 1
SECTION 3: SITE GEOLOGY 2
3.1 Seismic Design Parameters 2
SECTION 4: SUBSURFACE EXPLORATION 3
4.1 Soil Test Borings 3
SECTION 5: LABORATORY TESTS 4
5.1 Description of Soils (Visual-Manual Procedure) (ASTM D2488) 4
5.2 Natural Moisture Content (ASTM D2216) 4
5.3 Percent Passing #200 Sieve (ASTM D1140) 4
5.4 Atterberg Limits Tests (ASTM D4318) 4
SECTION 6: SUBSURFACE CONDITIONS 5
6.1 Existing Fill Soils 5
6.2 Residual Soils 5
6.3 Decomposed Rock 6
6.4 Auger Refusal 6
6.5 Groundwater 6
SECTION 7: SITE PREPARATION & GRADING CONSIDERATIONS 7
7.1 Anticipated Undercutting 7
7.2 Proofrolling of Subgrade Soils 7
7.3 Controlled Structural Fill 7
7.4 Backfilling of Utility Trenches 8
7.5 Surface Drainage and Protection of Soils During Grading 8
7.6 Excavation Considerations 8
7.7 Cut Embankments 9
7.8 Fill Embankments 9
SECTION 8: FOUNDATION RECOMMENDATIONS 10
8.1 Bearing Capacity and Settlement 10
8.2 General Foundation Recommendations 10
SECTION 9: FLOOR SLAB CONSIDERATIONS 11
SECTION 10: PAVEMENT RECOMMENDATIONS 12
DESIGN PAVEMENT SECTIONS – (SOIL CBR = 5) 12
10.1 Subgrade Restoration 12
SECTION 11: CONSTRUCTION MONITORING 13
11.1 Subgrade, Observations, Proofrolling 13
11.2 Fill Monitoring 13
11.3 Foundation Excavations 13
11.4 Pavement & Dense-Grade Base 13
SECTION 12: GENERAL REMARKS/REPORT LIMITATIONS 14
APPENDIX
Boring Location Plan
Approximate Existing Fill Contours Map
Boring Logs
Geotechnical Laboratory Summary
Previous Geotechnical Report

SECTION 1: SCOPE OF WORK

The purpose of the geotechnical exploration was to evaluate general subsurface conditions within the site for the proposed Irondale Library in Irondale, Alabama. This work was to supplement the "Preliminary Report of Subsurface Exploration and Geotechnical Engineering" dated 6/14/2017 performed by BECC. Our current work was conducted in accordance with the "Consultant Contract for Services" between Sain and BECC dated November 10, 2022. The following items were included as part of our scope of work:

1. Six (6*)* soil test borings drilled at the site to a depth of 20 feet below the existing ground surface or auger refusal, whichever is less.

2. Laboratory tests to include natural moisture content, Atterberg limits and percent passing #200 sieve.

3. A geotechnical engineering report is to include the following items:

    - A site plan illustrating the boring locations
    - Boring logs describing the subsurface and groundwater conditions encountered
    - Description of field and laboratory procedures
    - Discussion of site geology
    - Results of the laboratory tests performed
    - Presence of unsuitable soils within the borings
    - Recommendations for undercutting/treatment of unsuitable soils
    - General earthwork recommendations
    - Recommendations for foundation design
    - Floor slab recommendations
    - Pavement thickness recommendations

NOTE: Our scope of work included a Phase I Environmental Assessment report and was submitted in a separated report dated 12/1/2022.

SECTION 2: PROJECT DESCRIPTION

We understand that the project will consist of the development on the parcel of land located at 1032 Grants Mill Road in Irondale Alabama. Based historical photographs, the proposed site had an approximately 1.5 acre pond located on the northern portion of the site. The former pond is shown in the picture below.

Source: Google Earth 2002

Source: Google Earth 2016

It appears the former pond was filled between 2002 and 2006. The site is relatively clear with a high elevation of approximately 920 feet along the southern portion of the site to approximately 900 feet at Grants Mill Road.

The proposed site development consists of a library structure to be constructed on the south end of the site with a parking lot to be built in the area of the filled in pond. The new structure will cover a foot-print of approximately 16,000 square feet. We anticipate the structure will be single story with a slab-on-grade floor.

SECTION 3: SITE GEOLOGY

Based on the "Geological Map of Alabama", northeast sheet, 1988, the subject site is underlain by the Parkwood Formation. The Parkwood Formation consists interbedded sandstone, shale and siltstone. Sandstone is typically light to medium grey, very fine-to-fine grained, argillaceous, micaceous, and locally cross-bedded and ripple marked. Sandstone beds range from less than one-inch to 6-feet thick. Shales and mudstones are medium to dark grey and commonly micaceous. The shale beds range from thin and fissile to massive and generally weather to brownish grey.

Our experience with the Parkwood formation has indicated that bedrock is usually present from 10 to 20 feet below the existing surface; thus, excavation difficulty can arise when deep cuts are required. The Parkwood has shown that it can weather differentially, whereby soft clay seams can underlie relatively resistant shale beds. In addition, Jefferson County has been subjected to intense stress often resulting in tightly folded rock beds. These highly folded beds can occur across a site creating anomalous conditions such as pockets of collected groundwater or seamy rock. Wet weather springs and perennial springs are commonly encountered in excavations.

3.1 Seismic Design Parameters

The subsurface conditions at the site consist of fill/residual soils underlain by bedrock. Based on the borings performed at the site and our knowledge of the site geology, we recommend a seismic site class definition of "C" be used in design calculations (*International Building Code*). Site coefficient values for spectral response acceleration taken from the International Building Code are given below.

Site Location: 33.530964 Latitude -86.685823 Longitude

S_S	S_1	S_{MS}	S_{M1}	S_{DS}	S_{D1}	PGA_M	T_L	V_{S30}
0.33	0.11	0.34	0.15	0.22	0.10	0.17	12	530

SECTION 4: SUBSURFACE EXPLORATION

BECC performed six (6) soil test borings (designated B-1 through B-6) on November 18, 2022. The borings were drilled to depths of 7 to 23 feet below the existing surface. The boring locations were located in the field by BECC's engineers. The locations are shown on the "Boring Location Map" located in the Appendix and should be considered approximate.

We note a "Preliminary Report of Subsurface Exploration and Geotechnical Engineering" dated 6/14/2017 was performed by BECC. This report is included in the Appendix of this report.

4.1 Soil Test Borings

Soil drilling and sampling operations were conducted according to ASTM D1586. The test borings were advanced by mechanically twisting continuous steel auger flights. Within the test borings, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D. split spoon sampler. The sampler was first seated 6 inches to penetrate any loose cuttings and was then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of blows (*N*) required to drive the sampler the final 12 inches of penetration is the "Standard Penetration Resistance". The penetration resistance, when properly evaluated, is an index of the soil strength.

Representative portions of the samples obtained were then sealed in air-tight containers and transported to our laboratory. In the laboratory, the samples were classified by a geotechnical engineer. The soil description and the penetration resistance at the specific boring locations are indicated on the boring log sheets in the Appendix.

The boreholes were also examined for groundwater level at the time of drilling. The samples were transported to our laboratory to perform additional tests. All the samples will be stored on our premises for 60 days from submittal of this report and then discarded unless additional storage time is requested.

SECTION 5: LABORATORY TESTS

In addition to the field exploration, a limited laboratory testing program was conducted to ascertain additional engineering characteristics of the foundation materials. To supplement the visual classification of the soil samples, the following tests were performed. The results of the tests are shown on the "Geotechnical Lab Summary" and the individual test reports in the Appendix.

5.1 Description of Soils (Visual-Manual Procedure) (ASTM D2488)

The soil samples were visually examined by our engineer and soil descriptions were provided. Representative samples were then selected and tested to determine soil classification as described above. This data was used to correlate our visual descriptions with the Unified Soil Classification.

5.2 Natural Moisture Content (ASTM D2216)

Natural moisture contents (*M%*) were determined on selected samples. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of solid particles.

5.3 Percent Passing #200 Sieve (ASTM D1140)

Wash #200 tests were performed on the selected samples to determine the amount of "fines" in the represented soil. "Fines" are defined as particles with a grain size equal to or less than a diameter of 0.075 millimeters. These particles are typically found in silts, clays, and silty clays, as well as silty or clayey sands.

5.4 Atterberg Limits Tests (ASTM D4318)

Atterberg Limit tests were performed on the selected samples to determine how the characteristics change upon variation in moisture stage. The limits are bracketed by the Liquid Limit (*LL*) and the Plastic Limit (*PL*). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous fluid. The plastic Limit is the moisture content at which the soil is between the "plastic" and semi-solid stage. The soil's Plasticity Index (*PI*) is the difference between the Liquid Limit and the Plastic Limit. The PI is often used as the indicator of the soil's expansive tendencies. The greater the range between the LL and the PL, the more potentially expansive the soil can be.

SECTION 6: SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered by the test borings are shown on the boring log sheets in the Appendix. The general subsurface conditions encountered, and their pertinent characteristics are described in the following paragraphs. The stratification lines indicated on the logs of boring represent approximate boundaries between soil types. However, the actual transition may be gradual. Conditions represented by the test borings should be considered applicable only at the test boring locations on the dates shown, and it should be assumed that the conditions may be different at other locations at other times.

6.1 Existing Fill Soils

Existing fill soils were encountered in the borings and extended to approximately 3 to 23 feet below the existing grades. The existing fill soils typically consisted of medium stiff, sandy to silty clay and very loose to medium dense, silty to clayey sand. Standard penetration resistances (N-Values) in the fill soils varied from 4 to 16 blows per foot (bpf), averaging about 10 bpf. Laboratory tests were performed on select samples of the fill soil. The following are the results of the laboratory classification performed on the existing fill soils.

BORING NUMBER	SAMPLE DEPTH (FT)	MOISTURE (%)	ATTERBERG LIMITS LL	PL	PI	PERCENT FINES (%)	UNIFIED SOIL CLASSIFICATION
B-1	1.0 – 2.5	19.7	31	17	14	54.5	CL
B-2	3.5 – 5.0	17.5	35	19	16	61.5	CL
B-6	3.5 – 5.0	9.5	25	17	8	48.1	SC

The following table is the approximate existing fill thickness encountered at the boring locations.

BORING NO.	APPROXIMATE EXISTING FILL THICKNESS (ft.)	SURFACE ELEVATION (ft.)	APPROXIMATE BOTTOM OF EXISTING FILL ELEVATION (ft.)
B-1	10	916	906
B-2	12	913	901
B-3	5	913	908
B-4	3	917	914
B-5	13	914	901
B-6	23	914	891

6.2 Residual Soils

Residual soils are those that have been formed by the in-place weathering of the parent rock. The residual soils were typically encountered below the existing fill soils. The residual soils consisted of medium dense to very dense, silty sand and medium stiff, sandy, and silty clay. The soils extended to depths of approximately 6 to 15 feet below the ground surface. Standard Penetration Tests (*N-values*) within the residual soils ranged from 6 to 59 bpf, averaging about 27 bpf. The following are the results of the laboratory tests performed on the residual soils.

Boring Number	Sample Depth (ft)	Moisture (%)	Atterberg Limits LL PL PI	Percent Fines (%)	Unified Soil Classification
B-3	6.0 – 7.5	7.6	27 16 11	68.4	CL

6.3 Decomposed Rock

Decomposed rock was typically at the base of the residual soils. It is the transition from soil to rock. The decomposed rock encountered ranged in depth from approximately 6 to 15 feet. Although this material can be very dense and hard when in place, retained samples from the soil borings often consisted of sand, silt, clay and rock fragments. N-values within the decomposed rock were greater than 100 bpf.

6.4 Auger Refusal

Auger refusal is the drilling depth at which advancement of the borehole can no longer be accomplished by standard soil drilling; rock coring must be employed for further penetration. The auger refusal was due to resistant rock of the Pottsville Formation. The following is a summary of the auger refusal depths encountered in the borings.

BORING NO.	AUGER REFUSAL DEPTH (ft.)	SURFACE ELEVATION (ft.)	APPROXIMATE AUGER REFUSAL DEPTH (ft.)
B-1	15	916	901
B-2	20	913	893
B-3	16	913	897
B-4	7	917	900
B-5	17	914	897
B-6	23	914	891

6.5 Groundwater

Groundwater was not encountered at the boring locations at the time of drilling. The presence or absence of water in the boreholes at the time of drilling does not necessarily mean that groundwater will or will not be present at other times. “Perched” or trapped groundwater can occur at the contact between fill soils, residual soils, and bedrock. Groundwater levels fluctuate seasonally and are related to the amount of rainfall received in months prior to the observations.

SECTION 7: SITE PREPARATION & GRADING CONSIDERATIONS

A review of the final grading plans should be conducted by BECC, and subsequently some of the comments and recommendations included in this report may require modifications.

7.1 Anticipated Undercutting

As previously discussed, we note that existing fill soils were present at the site in the borings and identified in the previous preliminary geotechnical study. The thickest fill was located in the area of the filled in old pond. However, there was fill associated near the old house basement and the road that went around the pond (see Approximate Existing Fill Contour Map in the Appendix). The fill soils do not have appeared to have been systematically placed and compacted. The majority of the fill encountered consisted of sands and clays with some crushed stone base, asphalt millings, and occasional rock and concrete fragments. No thick deposits of organic material were not encountered at the test locations.

We recommend **all** of the existing fill soils within 10 feet of new building area be undercut completely and replaced with new compacted structural fill. Non-structural areas such as parking lots and roadways can be stabilized by partially undercutting (6 feet) and replacement with recompacted controlled structural fill (per section 7.3 of this report). We anticipate that the soils undercut can be stockpiled and reused as controlled structural fill. We note that the soil may need to be moisture conditioning to achieve compaction.

7.2 Proofrolling of Subgrade Soils

Following the undercutting as described in Section 7.1 of this report, areas that are at grade, or are to receive fill should be evaluated by the geotechnical engineer. This observation may include proofrolling with a loaded dual-axle dump truck (25 tons). The geotechnical engineer, by field examination, can determine the extent of any undercutting or reconditioning necessary to prepare an adequate subgrade. We suggest that an allowance for stabilization geogrid (BX 1200) be included in the construction budget incase there are areas in the new paving areas that are too soft to achieve stabilization with the 6 feet of new fill. The geogrid would be placed in the soft areas prior to placement of the new structural fill soils.

In the areas which are at grade, we recommend that the upper 8 inches of existing material be scarified, moisture-conditioned and recompacted. We recommend a compaction criteria of 98% of the Standard Proctor maximum dry density (ASTM D 698) within a moisture content range of 2% of the soil's optimum moisture content.

7.3 Controlled Structural Fill

BECC recommends that the controlled structural fill meet the following recommendations:

- Liquid Limit (LL) less than 50.
- Plasticity Index (PI) less than 30.
- Free of organics.
- Maximum rock size of 4 inches.
- Maximum dry density greater than 100 pcf.

All fill should be compacted to a minimum 98 percent of maximum dry density, as determined by the Standard Proctor ASTM D698. A sufficient number of field density tests should be performed to evaluate the grading contractor's performance during filling.

Lift thickness for general fills should be limited to 8 inches loose measure. Backfilling in limited access areas such as utility trenches should have a lift thickness limited to 4 inches loose measure.

We also recommend that structural fill be placed within 2 percent of optimum moisture content. The grading contractor should acknowledge the importance of proper fill moisture conditioning. We suggest that the project specifications address that both fill compaction and acceptable fill moisture content will be required for the acceptance of structural fills. It will be particularly important to have a water truck available if filling takes place during the hot, dry summer months.

7.4 Backfilling of Utility Trenches

Backfilling of storm drain and utility trenches is often accomplished in an uncontrolled manner, leading to subsequent settlement of the fill and cracking of concrete structures and pavements. We recommend that utility trenches be backfilled with acceptable fill in 4-inch lifts and compacted with pneumatic-piston tampers to the project requirements. Should seepage occur in utility trenches, it may be necessary to "floor" the trench with open-graded gravel to provide a dry working surface.

7.5 Surface Drainage and Protection of Soils During Grading

The soils at the site are moisture sensitive and can become easily disturbed causing loss of strength. Proper surface drainage will be very important during grading at the site. If the soils become wet after being exposed, it may become necessary to undercut or recondition. On many projects reworking of disturbed soils becomes a point of controversy. We recommend that the specifications for this project provide performance guidelines for protection of exposed soils and correction of disturbed areas.

7.6 Excavation Considerations

It is our opinion that it would be reasonable to require the contractor to bid the project on the basis of an unclassified excavation. With this situation, the contractors are given the available subsurface information and are required to evaluate the relative difficulty and cost of excavation. This is a commonly used approach to bidding excavation work in rock where there is a gradual change from soil to hard rock. We recommend that potential contractors be allowed access to the site to make their own determinations as to excavation conditions in light of their individual procedures and available equipment.

Excavation of the upper-level soils can generally be achieved with heavy earth moving equipment (dozers, scrapers, front-end loaders, backhoes, etc.). Decomposed rock (material with N values of 100+ blows per foot) can usually be excavated in large open excavations with a D-8 or D-9 dozer using a single shank hydraulic excavator.

Excavations below the drilling auger refusal levels (7 to 23 feet), will require blasting or the use of pneumatic hammers for rock removal. Narrow excavations and utility trenches will require considerable effort with hydraulic excavator rippers. Zones of non-rippable rock may be encountered.

7.7 Cut Embankments

The stability of cut slopes is usually controlled by the orientation of the cut and geologic discontinuities. The discontinuities may be remnant in fill soils, residual soils, or in rock beds. We anticipate permanent slopes will have heights of less than 20 feet. We recommend permanent cut slopes be no steeper than 2(H): 1(V) in compacted fill soils or residual soils. Temporary slopes should be in accordance with the Occupational Safety and Health Administration (OSHA).

It should be understood that the conditions of the soil or rock in which cuts are made have a significant effect on the slope configuration and long-term stability of the embankments. Therefore, during grading, a geotechnical engineer should periodically observe cut slopes as excavation proceeds because of the possibility of localized discontinuities that would require field adjustments to cut slope configuration.

7.8 Fill Embankments

Organic matter and large boulders should not be used in engineered fill. This also applies to construction of slopes and embankments. The following precautions should be observed during construction of fill embankments and slopes that are required to maintain long-term stability:

1. The embankment foundation soils should be free of compressible soils that can consolidate under the added load of the embankment fill.

2. The slope construction should commence at the toe of the proposed slopes and commence upwards as additional fill is placed. The engineered fill placed for slope construction should be benched into natural slopes to provide good contact and prevent the formation of weak zones (see Outside Slope Detail in Appendix.

3. **Typically during construction, the compaction equipment has access difficulty to compact soils along the shoulder. It is, therefore, important that during slope construction the bank is overfilled and then cut back to the required geometry into the compacted soils**. Failure to bench embankment fill into existing slopes, and to overfill and cut back the slopes, can result in a potential for slope failures.

4. The steepest recommended slope for fill embankments is 2 (H): 1 (V) up to 20 feet tall. If slopes are designed in a configuration other than that described, our office must be contacted in order to review the proposed design and to evaluate if changes to the recommendations made herein are permissible. The fill should be compacted as outlined in the controlled structural fill section of this report.

5. The slopes should be promptly vegetated to prevent erosion after construction.

6. The embankment construction should be done under the periodic review of a qualified geotechnical engineer. Sufficient testing during fill placement should be done to evaluate the contractor's performance during the filling embankments.

7. Since most fill slopes experience some long-term creep caused by gravity, we suggest that buildings be set back from the crest of fill slopes a distance at least as great as the thickness of fill and a minimum of 10 feet. We suggest a buffer of at least 5 feet between the curb line of the roadway and the crest of filled slopes. Some long-term settlement of fill embankments should be expected even if the fill is placed and compacted in a controlled manner. The settlement is a natural condition caused by a long-term increase in the fill moisture content.

SECTION 8: FOUNDATION RECOMMENDATIONS

The recommendations stated in the following sections are based on the data obtained through our exploration and experience with similar structures and subgrade conditions. It also assumes the recommendations in Section 7 are followed. For foundation design and construction, our recommendations are based on maximum column loads of 150 kips and maximum wall loads of 6 kips per linear foot. If the loads or larger, BECC needs to be notified to modify our recommendations.

8.1 Bearing Capacity and Settlement

It is our opinion the structure can be designed for support using a conventional spread foundations bearing in stiff residual soils or controlled structural fill. We recommend a maximum allowable bearing pressure of 2,500 psf for foundation design. Based on the maximum design loads, we expect the total foundation settlement to be one (*1*) inch or less and differential settlements (40' spacing) to be less than ½ inch.

8.2 General Foundation Recommendations

The following items should be included in the project specifications in regard to foundation design and construction.

1. We recommend minimum footing dimensions of 18 and 24 inches for continuous strip footings and individual column footings, respectively. Minimum footing embedment should be 12 inches.

2. **The footing bearing surface should be observed during construction by a BECC geotechnical engineer or their representative to verify that the soil complies with the above recommendations.**

3. Where it is necessary to extend a footing beyond the planned bearing depth in order to reach a suitable bearing level, the over-excavation should be backfilled with compacted engineered soil fill, lean concrete, or compacted crushed stone (#57).

4. If water is encountered in the footing excavations, extreme care should be exercised to ensure that the foundation subgrade is not disturbed. A thin concrete “mud mat” poured over surfaces should be used to protect them from any seepage which might enter foundation excavations.

5. The base of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as disturbance from rain, frost, or flooding. Surface runoff water should be drained away from the excavation and not be allowed to pond.

6. If possible, all footing concrete should be poured during the same day the excavation is made. If this is not possible, then the footing excavation should be adequately protected.

7. Backfill adjacent to exterior walls should be composed of clean soil fill meeting the project fill requirements. No debris or rubble should be placed adjacent to the exterior walls. Fill should be compacted immediately after placement to preclude surface water infiltration into the foundation materials.

8. Gutters, downspouts, leader pipes, and splash blocks should be used to carry roof drainage away from the structure. Roof runoff should discharge away from the structure. Exterior grades should be sloped away from the structure to achieve positive drainage of surface water.

SECTION 9: FLOOR SLAB CONSIDERATIONS

It is our opinion that the floor slab for the building can be built on-grade, achieving support from recompacted on-site stiff soils or new controlled structural fill. A modulus of subgrade reaction (k for a 1 square foot bearing plate) value of 150 pounds per cubic inch (pci) is recommended for floor slab design.

We recommend soils in floor slab areas be compacted to a minimum of 98% of the Standard Proctor maximum dry density (ASTM D698). Prior to any fill placement or floor slab construction, we recommend that the exposed sub-grade materials be evaluated by a BECC representative. This evaluation may include proofrolling with a tandem dump truck (minimum 25 tons). Any soft or unstable areas will require undercutting and replacement with compacted engineered fill.

In addition, we suggest that all ground supported slabs be founded on a minimum of 4 inches of open graded stone (#57) or 6 inches of dense graded stone (#610 or #825). The granular materials will provide more uniform support, and also to act as a capillary break. We recommend that slab joints and construction be in accordance with the guidelines of the American Concrete Institute (ACI) and the Portland Cement Association (PCA).

On most projects, there is a significant time lag between initial grading and the time when the contractor is ready to construct the slab-on-grade. Even though the soils may have been placed and compacted adequately during initial grading, exposure to weather, construction traffic, etc., can destroy the integrity of subgrade soils. On many projects, this becomes a point of controversy when remedial work is required for proper slab support.

SECTION 10: PAVEMENT RECOMMENDATIONS

In areas that will be paved and are not at grade or will be cut, the soils exposed should be scarified, moisture conditioned and compacted to 98% of their Standard Proctor maximum dry density within 2% of the soil's optimum moisture content. The pavement sections are designed based on a CBR of 5 or larger. Any new fill soils should meet this design requirement.

DESIGN PAVEMENT SECTIONS – (SOIL CBR = 5)

PARKING LOT (Car Parking Lot Only)	
OPTION 1	2" - Bituminous Concrete Wearing Surface Layer ALDOT 424-A, ½ inch Maximum Size Aggregate 6" - Crushed Aggregate Base ALDOT 825 Type B
OPTION 2	5" - Portland Cement Concrete Pavement (f'c = 4000 psi) ALDOT 450 4" - Crushed Stone Base ALDOT 825, Type B

MEDIUM DUTY (Driveways and Access to Garbage Dumpster)	
OPTION 1	1" - Bituminous Concrete Wearing Surface Layer ALDOT 424-A, ½ inch Maximum Size Aggregate 2" - Bituminous Concrete Binder Layer ALDOT 424-B, 1 inch Maximum Size Aggregate 6" - Crushed Aggregate Base ALDOT 825 Type B
OPTION 2	6" - Portland Cement Concrete Pavement (f'c = 4000 psi) ALDOT 450 4" - Crushed Stone Base ALDOT 825, Type B

In concrete paving, reinforcing steel is typically not necessary if a liberal joint pattern is used in design, and proper workmanship is conducted. Construction joints should not exceed a spacing of 30 times the concrete thickness. Therefore, a joint spacing no greater than 12 feet for 5 inch thick concrete pavement and 15 feet for 6 inch thick concrete pavement.

10.1 Subgrade Restoration

Typically during construction, pavement subgrades become disturbed because of traffic and environmental conditions. Prior to construction of pavements, it is essential that the subgrade be restored to a properly compacted condition. The specifications should include notes pertaining to subgrade restoration immediately prior to pavement construction. The on-site soils have a tendency to lose shear strength (and consequently pavement support capability) if they are permitted to dry, and are later exposed to free water. Thus, proper moisture conditioning of the subgrade prior to placement of the pavement base cause will result in better pavement performance.

SECTION 11: CONSTRUCTION MONITORING

We strongly recommend that **BECC, Inc.** be retained to provide a comprehensive construction-monitoring program when the project proceeds. This program would assist the owner in determining that the work is being carried out in general conformance with the plans and specifications and help avoid the potential of change orders and cost overruns. Construction monitoring includes testing of construction materials such as compacted fill and concrete. Also included is engineering observation during the site preparation, foundation and wall construction phases of the project.

Monitoring/testing during the earthwork and foundation construction phases is particularly important since assumptions (and recommendations) have been made based on the soil boring data. Confirmation that actual subsurface conditions are comparable to the assumed conditions is an essential part of the subsurface exploration process.

11.1 Subgrade, Observations, Proofrolling

The purpose of proofrolling will be to densify the exposed near-surface soils and also to reveal soft pockets of soil that will require remedial measures. Areas that pump or rut during the proofrolling operations should be undercut or reconditioned. The geotechnical engineer can determine the depth and extent of areas that will require undercutting.

11.2 Fill Monitoring

We recommend that in-place density tests should be performed in the field by an engineering technician to evaluate the contractor's performance regarding meeting the project specifications for fill placement. A commonly used testing frequency is one (1) test per eight (8) inch lift to fill placed per 2,500 square feet of fill area. The engineering technician can assist the grading contractor in soil moisture content evaluation by performing on-site fill moisture content tests.

11.3 Foundation Excavations

We recommend that the excavations for foundations be observed and tested by a BECC representative. Such testing is necessary to determine the appropriateness of the bearing level, the adequacy of the bearing materials and the conformity of the foundation to the specification with respect to depth, planned dimensions, cleanliness, etc.

11.4 Pavement & Dense-Grade Base

We recommend that the placement of dense-grade base and pavement be observed and tested by a BECC geotechnical engineer or engineering technician. Such testing is necessary to determine the appropriateness of the compaction of material to conform to the specifications and recommendations set forth herein.

SECTION 12: GENERAL REMARKS/REPORT LIMITATIONS

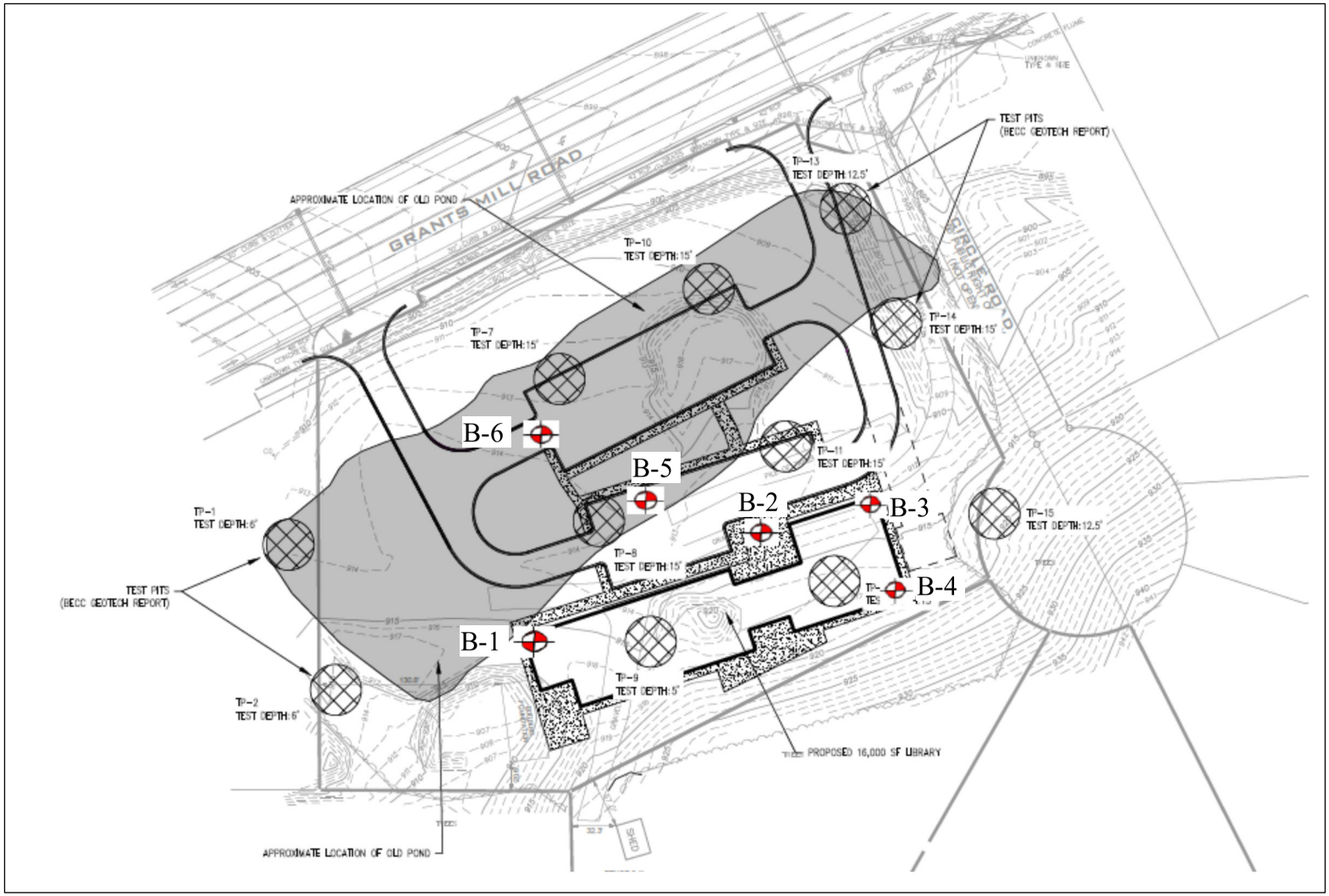
This report has been prepared for the exclusive use of **Sain Associates** for specific application to the subject project. All recommendations contained in this report have been made in accordance with generally accepted soil and foundation engineering practices. No other warranties are implied or expressed. In addition, the analysis and recommendations submitted in this report are based in part upon the data obtained from the test locations. The nature and extent of variations between the test locations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

We emphasize that this report was for design purposes only and is not sufficient to prepare an accurate bid. Contractors reviewing this report should acknowledge that the recommendations and discussions herein are for design purposes.

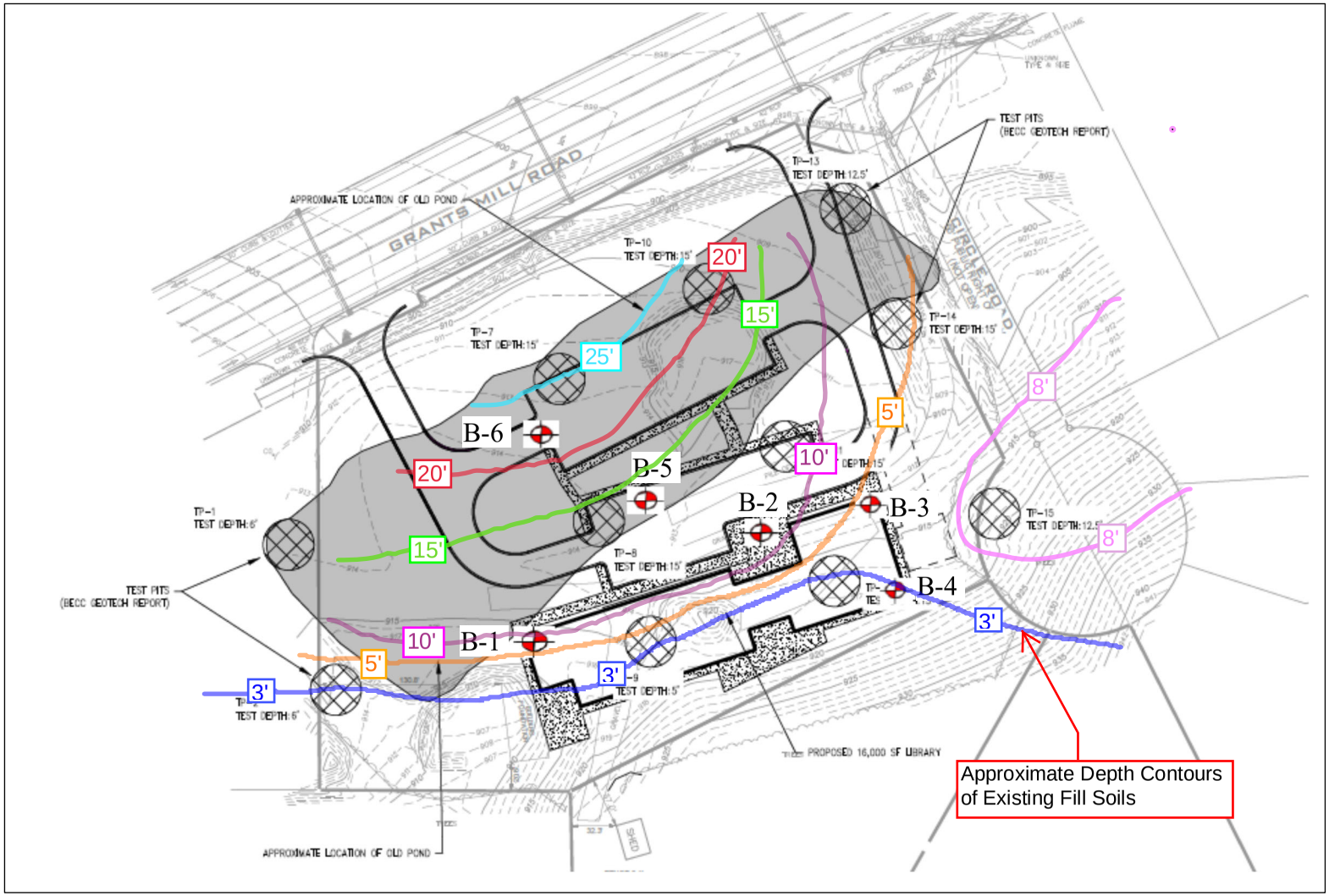
If significant changes are made in the character of the proposed development, a consultation should be arranged to review them with respect to prevailing subsurface conditions. At that time, it may be necessary to submit supplementary recommendations.

It is imperative that the geotechnical engineer be provided the opportunity to review the final plans and specifications to verify that the recommendations in this report are properly interpreted and incorporated in the design. It will be the client's responsibility to furnish the final grading and foundation plans to BECC for the necessary review. If the geotechnical engineer is not accorded the privilege of making this recommended review, we can assume no responsibility for misinterpretation of our recommendations.

APPENDIX



BECC Birmingham Engineering and Construction Consultants, Inc. Geotechnical, Materials, and Environmental Engineers	**Irondale Library** Irondale, Alabama	**Boring Location Map**	BECC Project No: 222119	Date: 12/1/2022
		Scale: 1” = 120’	Map Sheet Sheet 1 of 1	



BECC Birmingham Engineering and Construction Consultants, Inc. Geotechnical, Materials, and Environmental Engineers	**Irondale Library** Irondale, Alabama	**Approximate Existing Fill Contours Map**	BECC Project No: 222119	Date: 12/1/2022
		Scale: 1” = 120’	Map Sheet Sheet 1 of 1	

BECC, Inc.
360 Industrial Lane
Birmingham, AL 35226
(205) 941-1119

PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-1

BORING LOCATION SEE MAP

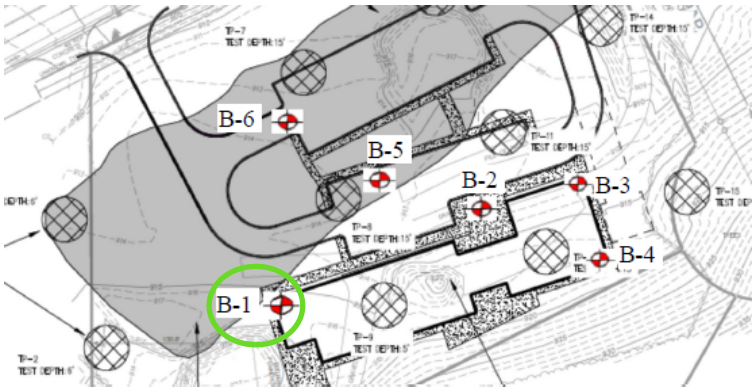
GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 916 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

LOGGED BY F. Dimas **REVIEWED BY** R.Rhinehart



ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
915	0		CL	FILL: Medium Stiff, Brown-Dark Gray, Very Sandy CLAY	SS 1		3-2-5 (7)		19.7	31	14	54.5		
	5				SS 2		4-5-4 (9)							
910					SS 3		3-4-3 (7)							
	10			FILL: Medium, Dense, Brown, Silty SAND; trace of rock fragments	SS 4		8-7-6 (13)							No Groundwater Encountered at Time of Drilling
905	15			RESIDUUM: Very Dense, Tan-Red, Silty SAND	SS 5		35-27-32 (59)							

Soil boring terminated at 15.0 feet due to auger refusal

BECC, Inc.
360 Industrial Lane
Birmingham, AL 35226
(205) 941-1119

PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-2

BORING LOCATION SEE MAP

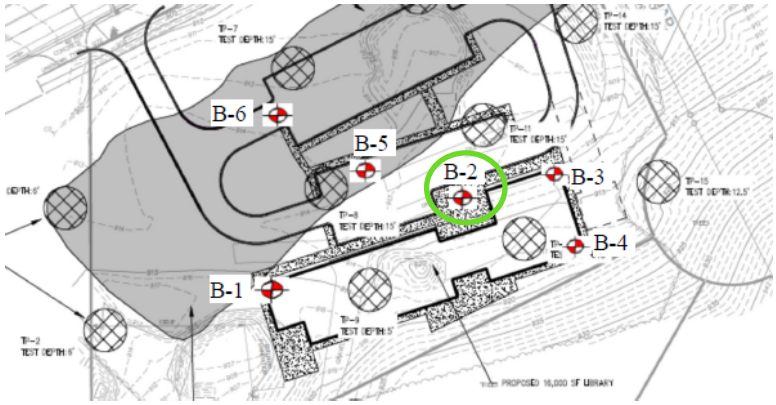
GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 913 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

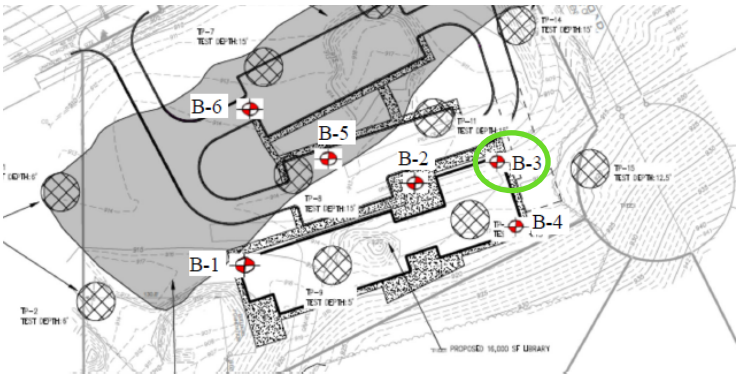
LOGGED BY F. Damas **REVIEWED BY** R.Rhinehart



ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
	0			Asphalt and Stone Base Mixture (Possible Millings)										
				FILL: Medium Stiff, Dark Red, Silty CLAY; trace of rock fragments	SS 1		1-2-4 (6)							
910			CL		SS 2		16-3-3 (6)		17.5	35	16	61.5		
	5				SS 3		3-3-6 (9)							
905				FILL: Very Loose, Brown, Silty SAND;	SS 4		2-2-2 (4)							No Groundwater Encountered at Time of Drilling
	10													
900				RESIDUUM: Very Dense, Tan-Red, Silty SAND	SS 5		5-8-6 (14)							
	15													
895				DECOMPOSED ROCK: Very Dense, Tan, Silty SAND; trace of rock fragments	SS 6		30-30-50/4" (100+)							
	20													

Soil boring terminated at 20.0 feet due to auger refusal

BECC, Inc.
360 Industrial Lane
Birmingham, AL 35226
(205) 941-1119



PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-3

BORING LOCATION SEE MAP

GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 913 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

LOGGED BY F. Damas **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
	0			FILL: Loose, Dark Gray, Silty SAND	SS 1		4-3-3 (6)							
910					SS 2		6-4-2 (6)							
	5		CL	RESIDUUM: Medium Stiff, Gray-Tan, Very Sandy CLAY	SS 3		2-3-5 (8)		7.6	27	11	68.4		
905				RESIDUUM: Medium Dense, Red-Tan, Silty SAND	SS 4		7-11-16 (27)							No Groundwater Encountered at Time of Drilling
	10													
900				DECOMPOSED ROCK: Very Dense, Tan-Red, Silty SAND; trace of rock fragments	SS 5		14-50/5"- (100+)							
	15													

Soil boring terminated at 16.0 feet due to auger refusal

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Birmingham, AL 35226
(205) 941-1119

PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-4

BORING LOCATION SEE MAP

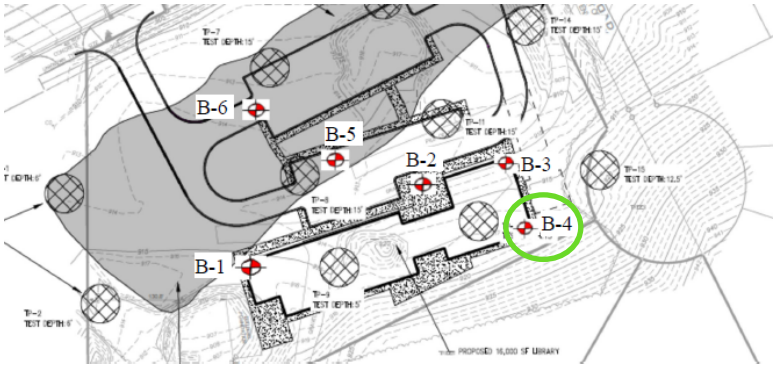
GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 917 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

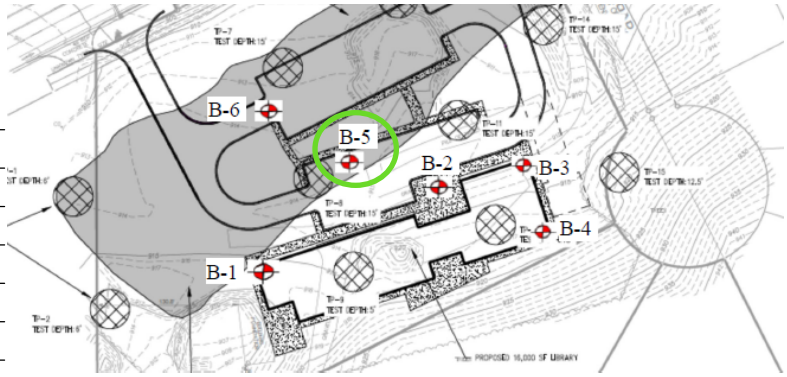
LOGGED BY F. Damas **REVIEWED BY** R.Rhinehart



ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
	0			FILL: Loose, Dark Gray, Silty SAND; trace of rock fragments	SS 1		2-2-3 (5)							
915				RESIDUUM: Medium Dense, Tan, Silty SAND	SS 2		16-15-11 (26)							No Groundwater Encountered at Time of Drilling
	5													
910				DECOMPOSED ROCK: Very Dense, Tan-Red, Silty SAND; trace of rock fragments	SS 3		19-50/5"- (100+)							

Soil boring terminated at 7.0 feet due to auger refusal

BECC, Inc.
360 Industrial Lane
Birmingham, AL 35226
(205) 941-1119



PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-5

BORING LOCATION SEE MAP

GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 914 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

LOGGED BY F. Damas **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
	0			FILL: Loose, Tan, Silty SAND	SS 1		5-4-6 (10)							
910	5				SS 2		5-3-5 (8)							
					SS 3		5-3-5 (8)							
905	10			FILL: Medium Stiff, Brown, Silty CLAY	SS 4		7-6-7 (13)							No Groundwater Encountered at Time of Drilling
900	15			DECOMPOSED ROCK: Very Dense, Tan, Silty SAND; trace of rock fragments	SS 5		17-50/3"- (100+)							

Soil boring terminated at 17.0 feet due to auger refusal

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360 Industrial Lane
Birmingham, AL 35226
(205) 941-1119

PROJECT Irondale Library

BECC PROJECT NO. 222119 **BORING NUMBER** B-6

BORING LOCATION SEE MAP

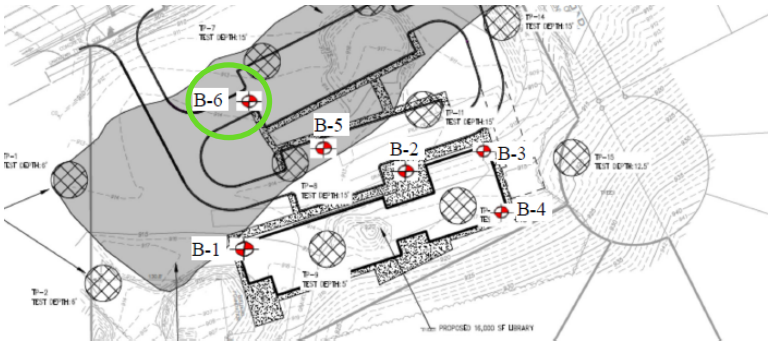
GEOLOGY Parkwood Formation

DATE COMPLETED 11/18/2022 **GROUND ELEVATION** 914 ft

METHOD Solid Stem Auger **HOLE DIAMETER** 6 inches

CONTRACTOR South Brothers Drilling

LOGGED BY F. Damas **REVIEWED BY** R.Rhinehart



ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	UNIFIED CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE (20 40 60 80)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
	0			FILL: Medium Dense, Brown, Clayey SAND; some rock fragments	SS 1		5-4-7 (11)							
910	5		SC	FILL: Loose, Brown-Red, Clayey SAND	SS 2		3-3-4 (7)		9.5	25	8	48.1		No Groundwater Encountered at Time of Drilling
					SS 3		5-5-6 (11)							
905	10			FILL: Medium Stiff, Brown, Silty CLAY	SS 4		3-4-3 (7)							
900	15			FILL: Stiff, Tan-Gray, Silty CLAY; trace of rock fragments; wet	SS 5		5-9-7 (16)							
895	20			FILL: Loose, Limestone GRAVEL and Soft, Brown CLAY; wet	SS 6		30-22-35 (57)							

Soil boring terminated at 23.0 feet due to auger refusal

GEOTECHNICAL LAB SUMMARY

Project Name: Irondale Library
BECC Project No.: 222119

Boring	Sample		Percent Passing #200 Sieve	Moisture (%)	Atterberg Limits			Unified Soil Classification
	Start Depth (ft.)	End Depth (ft.)			LL	PL	PI	
B-1	1.0	2.5	54.5	19.7	31	17	14	**CL**
B-2	3.5	5.0	61.5	17.5	35	19	16	**CL**
B-3	6.0	7.5	68.4	7.6	27	16	11	**CL**
B-6	3.5	5.0	48.1	9.5	25	17	8	**SC**

BECC

PREVIOUS GEOTECHNICAL REPORT

REPORT FOR SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING EVALUATION FOR

1032 Grants Mill Road
Irondale, Alabama
BECC Project Number: 217033

GEOTECHNICAL, MATERIALS, AND ENVIRONMENTAL ENGINEERS

Geotechnical, Materials, and Environmental Engineers

LISA K. MORRISON
President & CEO

RICHARD A. RHINEHART, P.E.
Senior Vice President

MARTIN T. BURFORD, P.E.
Vice President

June 14, 2017

Mr. Jason Rogoff
c/o Meredith Calhoun, CCIM
Corporate Realty Associates, Inc.
60 14th Street South
Suite 104
Birmingham, Alabama 35233

Subject: Preliminary Report of Subsurface Exploration and Geotechnical Engineering Evaluation for
1032 Grants Mill Road
Irondale, Alabama
BECC Project Number: 217033

Dear Mr. Rogoff:

Birmingham Engineering and Construction Consultants, Inc. (BECC) has completed the authorized Preliminary Subsurface Exploration and Geotechnical Engineering Evaluation for the subject project. This work was conducted in accordance with our proposal number Q1-17119 dated May 26, 2017.

The purpose of our work was to perform a preliminary subsurface exploration for the parcel located at 1032 Grants Mills Road in Irondale, Alabama. This report outlines the exploration procedures used, exhibits the data obtained, and presents our conclusions and recommendations.

We sincerely appreciate the opportunity to have worked with you on this project. If you have any questions, or if we may be of further service to you, please call us.

Respectfully submitted,

BECC, Inc.

Justin M. Miller, P.E.
Project Engineer

Richard A. Rhinehart, P.E.
Senior Vice President

Geotechnical, Materials & Environmental Engineers
360 Industrial Lane | Birmingham, Alabama 35211
Ph. (205) 941-1119 | Fax (205) 941-1198

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 3

2.0 SCOPE OF WORK 4

3.0 PROJECT & SITE DESCRIPTION 4

4.0 SITE GEOLOGY 5

5.0 SUBSURFACE EXPLORATION 5
- 5.1 TEST PIT EXCAVATIONS 5

6.0 LABORATORY TESTS 5
- 6.1 DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D 2488) 5
- 6.2 NATURAL MOISTURE CONTENT (ASTM D 2216) 5
- 6.3 PERCENT PASSING #200 SIEVE (ASTM D 1140) 6
- 6.4 ATTERBERG LIMIT TESTS (ASTM D 4318) 6

7.0 SUBSURFACE CONDITIONS 6
- 7.1 EXISTING FILL SOILS 6
- 7.2 ALLUVIAL SOILS 7
- 7.3 RESIDUAL SOILS 7
- 7.4 TEST PIT REFUSAL 7
- 7.5 GROUNDWATER 7

8.0 PRELIMINARY SITE PREPARATION AND GRADING CONSIDERATIONS 8
- 8.1 EXISTING STRUCTURES 8
- 8.2 UNDERCUTTING OF UNSUITABLE SOILS 8
- 8.3 CONDITIONING OF SUBGRADE SOILS 8
- 8.4 CONTROLLED STRUCTURAL FILL 9
- 8.5 BACKFILLING OF UTILITY TRENCHES 9
- 8.6 SURFACE DRAINAGE & PROTECTION OF SOILS DURING GRADING 9

9.0 PRELIMINARY FOUNDATION RECOMMENDATIONS 10
- 9.1 OPTION 1 – SHALLOW SPREAD FOUNDATIONS ON NEW COMPACTED STRUCTURAL FILL 10
  - 9.1.1 SPREAD FOUNDATION CONSTRUCTION 10
- 9.2 OPTION 2- DRIVEN H-PILES (DEEP FOUNDATION SYSTEM) 11
- 9.3 ESTIMATED ADDITIONAL FOUNDATION EXPENSE 11

10.0 FLOOR SLAB SUPPORT 12

11.0 PAVEMENT DESIGN 13
- 11.1 GENERAL PAVEMENT CONSIDERATIONS 14

12.0 CONSTRUCTION MONITORING 15
- 12.1 SUBGRADE OBSERVATION, PROOFROLLING 15
- 12.2 FILL MONITORING 15
- 12.3 FOUNDATION EXCAVATIONS 15
- 12.4 PLACEMENT OF PAVEMENT & DENSE-GRADE BASE 15

13.0 GENERAL REMARKS/REPORT LIMITATIONS 16

APPENDIX
- TEST PIT LOCATIONS MAP
- TEST PIT LOGS WITH LABORATORY RESULTS
- GEOTECHNICAL LAB SUMMARY
- PHOTOGRAPHIC LOG

1.0 EXECUTIVE SUMMARY

The project site is located at 1032 Grants Mill Road in Irondale, Alabama. The following is a brief summary of the exploration including our findings, conclusions and recommendations. Refer to subsequent sections within the text for detailed discussions of these topics.

- Based historical photographs, the proposed site had an approximately 1.5 acre pond located on the northern portion of the site. This pond has been filled.

- Eleven (11) test pits were excavated with a trackhoe to 5 to 15 feet below the existing ground surface. Existing fill soils were encountered below the surface materials at most of the test pit locations. The fill soils typically consisted of soft to stiff sandy clays with varying amounts of construction debris (bricks, concrete, wood, asphalt, etc.) and rock fragments. The depths of the existing fill materials ranged from approximately 3 to greater than 15 feet. Alluvial soils were encountered in test pit location TP-8 beginning at approximately 5 feet and extending to the test pit termination depth of 15 feet. These soils typically consisted of loose gray silty sands with rock fragments. Residual soils were encountered below the fill soils and typically consisted of stiff sandy clays. Groundwater was encountered in test pits TP-8, TP-10, and TP-11 at approximately 10 feet below the existing ground surface at the time of our exploration.

- The subsurface conditions that will have a major impact on site development is the presence of existing fill soils with varying amounts of construction debris and rock fragments. It appears that a pond was once located on the site, and was eventually filled. The existing fill contains varying amounts of debris and extended to depths of approximately 15 feet below the ground surface at the test pit locations. Settlement of structures founded over the existing fill material is a significant concern.

- In our opinion the existing fill materials are not suitable to support new buildings. The existing fill material could be undercut from proposed building areas and replaced with new compacted structural fill or a deep foundation system could be used to provide foundation support.

- We recommend a maximum net allowable bearing pressure of 3,000 psf for spread foundation designed in new engineered fill.

- New structures supported by a deep foundation system consisting of H-piles (HP 12x53) driven to bedrock can be designed for an allowable downward pile of capacity 70 tons.

- We recommend floor slabs be supported on a minimum of 3 feet of new compacted structural fill soils. BECC recommends soils in floor slab areas be compacted to a minimum of 98% of the Standard Proctor maximum dry density (ASTM D 698). We recommend a minimum of 4 inches of ALDOT No. 57 stone or 6 inches of ALDOT No. 610 stone be placed above the final subgrade in floor slab areas in order to act as a capillary break.

- Flexible and rigid pavement sections are presented for light, medium and heavy duty traffic. The existing fill in paving areas will require reconditioning, and the possibility of some undercutting to provide pavement support.

NOTE: It should be noted that this executive summary presents selected elements of our findings and recommendations **only.** It **does not** present crucial details needed for the proper application of our findings and recommendations. Our findings, recommendations, and application are related **only through the full report**, and are best evaluated with the active participation of the geotechnical engineer who developed them.

2.0 SCOPE OF WORK

The purpose of the preliminary geotechnical exploration was to evaluate general subsurface conditions within the site and to gather and present data for the parcel located at 1032 Grants Mill Road in Irondale, Alabama. This work was conducted in accordance our proposal number Q1-17119 dated May 26, 2017. The following items were included as part of our scope of work:

1. Eleven (11) test pits were excavated on the property to depths of 5 to 15 feet below the existing ground surface.

2. Laboratory tests to include natural moisture content, Atterberg limits and percent passing #200 sieve.

3. A geotechnical engineering report is to include the following items:
   - A site plan illustrating the test pit locations
   - Test pit logs describing the subsurface and groundwater conditions encountered
   - Description of field and laboratory procedures
   - Discussion of site geology
   - Results of the laboratory tests performed
   - Presence of unsuitable soils within the test pits
   - General earthwork recommendations
   - Recommendations for foundation design
   - Floor slab recommendations
   - Pavement section recommendations

NOTE: Our scope of work did not include detection or evaluation of site soils for contaminates.

3.0 PROJECT & SITE DESCRIPTION

We understand that the project will consist of the development on the parcel of land located at 1032 Grants Mill Road in Irondale Alabama. Based historical photographs, the proposed site had an approximately 1.5 acre pond located on the northern portion of the site. The former pond is shown in the picture below.

Source: Google Earth 2002

Source: Google Earth 2016

It appears the former pond was filled between 2002 and 2006. The site is relatively clear with a high elevation of approximately 960 feet along the southern portion of the site to approximately 910 feet at Grants Mill Road.

4.0 SITE GEOLOGY

Based on the "Geological Map of Alabama", northeast sheet, 1988, the subject site is underlain by the Parkwood Formation. The Parkwood Formation consists interbedded sandstone, shale and siltstone. Sandstone is typically light to medium grey, very fine-to-fine grained, argillaceous, micaceous, and locally cross-bedded and ripple marked. Sandstone beds range from less than one-inch to 6-feet thick. Shales and mudstones are medium to dark grey and commonly micaceous. The shale beds range from thin and fissile to massive and generally weather to brownish grey.

Our experience with the Parkwood formation has indicated that bedrock is usually present from 10 to 20 feet below the existing surface; thus, excavation difficulty can arise when deep cuts are required. The Parkwood has shown that it can weather differentially, whereby soft clay seams can underlie relatively resistant shale beds. In addition, Jefferson County has been subjected to intense stress often resulting in tightly folded rock beds. These highly folded beds can occur across a site creating anomalous conditions such as pockets of collected groundwater or seamy rock. Wet weather springs and perennial springs are commonly encountered in excavations.

5.0 SUBSURFACE EXPLORATION

BECC performed eleven (11) test pits (designated TP-1 through TP-15, test pits TP-3 through TP-6 were omitted) on June 2, 2017. The test locations were located in the field by BECC by pacing distances and estimating right angles from existing buildings. The test pit locations are to be considered approximate and are shown on the "Test Pit Location Map" in the Appendix.

5.1 TEST PIT EXCAVATIONS

The test pits were excavated using a track mounted backhoe (Takeuchi TB 2150). Field pocket penetrometer tests were performed on representative soils from the test pits. The penetration resistance, when properly evaluated, is an index of the soil strength. Representative samples were obtained at standard intervals from the test pit excavations.

6.0 LABORATORY TESTS

In addition to the field exploration, a limited laboratory testing program was conducted to ascertain additional engineering characteristics of the foundation materials and to supplement the visual classification of the soil samples. The following tests were performed:

6.1 DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D 2488)

The soil samples were visually examined by our engineer and soil descriptions were provided. Representative samples were then selected and tested to determine soil classification as described above. This data was used to correlate our visual descriptions with the Unified Soil Classification.

6.2 NATURAL MOISTURE CONTENT (*ASTM D 2216*)

Natural moisture contents (*M%*) were determined on selected samples. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of solid particles. The test results are shown in the "Log of Test Pit" sheets in the Appendix.

6.3 PERCENT PASSING #200 SIEVE (*ASTM D 1140*)

Wash #200 tests were performed on the selected samples to determine the amount of "fines" in the represented soil. "Fines" are defined as particles with a grain size equal to or less than a diameter of 0.075 millimeters. These particles are typically found in silts, clays, and silty clays, as well as silty or clayey sands.

6.4 ATTERBERG LIMIT TESTS (*ASTM D 4318*)

Atterberg Limit tests were performed on the selected samples to determine how the characteristics change upon variation in moisture stage. The limits are bracketed by the Liquid Limit (*LL*) and the Plastic Limit (*PL*). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous fluid. The plastic Limit is the moisture content at which the soil is between the "plastic" and semi-solid stage. The soil's Plasticity Index (*PI*) is the difference between the Liquid Limit and the Plastic Limit. The PI is often used as the indicator of the soil's expansive tendencies. The greater the range between the LL and the PL, the more potentially expansive the soil can be. The test results are shown in the "Log of Test Pit" sheets in the Appendix.

7.0 SUBSURFACE CONDITIONS

Details of the subsurface conditions encountered by the test pits are shown on the "Log of Test Pit" sheets in the Appendix. The general subsurface conditions encountered and their pertinent characteristics are described in the following paragraphs. The stratification lines indicated on the test pit logs represent approximate boundaries between soil types. However, the actual transition may be gradual. Conditions represented by the subsurface logs should be considered applicable only at the test locations on the dates shown, and it should be assumed that the conditions may be different at other locations at other times.

7.1 EXISTING FILL SOILS

Existing fill soils were encountered in all test pit locations except TP-11. These fill soils in test pit locations TP-1, TP-7, TP-8, TP-10, and TP-13 typically consisted of soft to stiff sandy clays with varying amounts of construction debris (bricks, concrete, wood, asphalt, etc.) and rock fragments. The other fill soils encountered typically consisted of stiff sandy clays with rock fragments. The depths of the fill soils at the test locations ranged from approximately 3 to greater than 15 feet. Pocket penetrometer values were performed on the collected test pit samples and ranged from 0 to 4.5 tons/ft^2 with an average shear strength of 1.8 tons/ft^2.

Laboratory tests were performed on select samples of the fill soils. Natural moisture contents ranged from 7.9% to 20.5%. Two (2) Atterberg Limit tests were performed on the fill soils. The tests indicated Liquid Limits (*LL*) of 33 and 27, plasticity indexes (*PI*) of 16 and 12, with 22.9% and 21.8% of material passing a #200 sieve. Based on laboratory tests performed, the fill soils were classified as clayey sands with rock fragments (SC). A detailed laboratory summary can be found in the Appendix.

7.2 ALLUVIAL SOILS

Alluvial soils were encountered in test pit location TP-8 beginning at approximately 5 feet and extending to the test pit termination depth of 15 feet below the existing ground surface. Alluvial soils are formed by deposits of water such as creeks, streams and rivers. The soils are typically unconsolidated, have high moisture contents, and have vary amounts of organics. These soils typically consisted of loose gray silty sands with rock fragments.

Laboratory tests were performed on select samples of the alluvial soils. Natural moisture contents ranged from 18.3% to 18.8%. One (1) Atterberg Limit tests was performed on the alluvial soils. The test indicated a Liquid Limit (*LL*) of 31, plasticity index (*PI*) of 11, with 37.2% of material passing a #200 sieve. Based on laboratory tests performed, the fill soils were classified as clayey sands (SC). A detailed laboratory summary can be found in the Appendix.

7.3 RESIDUAL SOILS

Residual soils are those which have been formed by the in-place weathering of the parent rock. The residual soils were typically encountered below the existing fill soils and extended to the test pit termination depths of 6 to 15 feet. These soils consisted typically of medium stiff to stiff red tan sandy clays with some rock fragments. Pocket penetrometer values were performed on the collected test pit samples and ranged from 0.5 to 4.5 tons/ft^2 with an average shear strength of 2.4 tons/ft^2. Laboratory tests were performed on select samples of the alluvial soils. Natural moisture contents ranged from 15.6% to 22.3%.

7.4 TEST PIT REFUSAL

Test pit TP-1 reached test pit refusal at a depth of approximately 6 feet below the existing ground surface. The track-hoe (Takeuchi TB 2150) could not excavate below 6 feet because of concrete debris.

7.5 GROUNDWATER

Groundwater was encountered at the time of excavation in test pit locations TP-8, TP-10 and TP-11 at 10 feet below the ground surface. We note that "perched water" is often encountered at the contact between fill soils, alluvial soils, residual soils and rock because of the varying percolation rates in different materials. The presence or absence of water in the boreholes at the time of drilling does not necessarily mean that groundwater will or will not be present at other times. Groundwater levels fluctuate seasonally and are related to the amount of rainfall received in months prior to the observations.

8.0 PRELIMINARY SITE PREPARATION AND GRADING CONSIDERATIONS

A review of the final grading plans should be conducted by BECC, and subsequently some of the comments and recommendations included in this report may require modifications.

The subsurface conditions that will have a major impact on site development is the presence of existing fill soils with varying amounts of construction debris and rock fragments. It appears that a pond was once located on the site, and was eventually filled. The existing fill contains varying amounts of debris and extended to depths of approximately 15 feet below the ground surface at the test pit locations. Settlement of structures founded over the existing fill material is a significant concern.

8.1 EXISTING STRUCTURES

All existing structures (including above and below ground construction) within the areas to be developed should be removed. Removal should include all vegetation, topsoil, underground pipes and lines, etc., that might interfere with construction. If abandoned underground utilities are to be removed prior to initiation of construction, provisions should be made in the construction specifications and budget to restore the subgrade to a stable condition. Restoration should include backfilling and compaction of the excavated areas.

8.2 UNDERCUTTING OF UNSUITABLE SOILS

In our opinion, soil bearing building foundations should not be supported on the existing fill soils due for the potential for excessive settlement. We recommend the following two alternatives for building foundations located in the area of the "old pond":

1. All of the existing fill soils within 10 feet of new building areas should be undercut completely and replaced with new compacted structural fill. Conventional shallow spread footings could then be supported in the newly compacted structural fill. After undercutting, the exposed soils should be evaluated by the geotechnical engineer to determine if they are suitable for placement of new engineered fill. Soils in paving areas will need to be reconditioned or undercut to provide suitable support.

2. Installation of a deep foundation system.

Provisions should be made in the construction specifications and budget for undercutting and/or reconditioning of the poor quality upper soils based on one of the stated alternatives. The specifications should also state that clean, structural fill meeting the recommendations in Section 8.4 of this report must be used to replace all undercut soils.

8.3 CONDITIONING OF SUBGRADE SOILS

Following the removal of the existing fill, areas that are at grade, or are to receive fill should be evaluated by the geotechnical engineer. This observation may include proofrolling with a loaded dump truck or other pneumatic-tired construction equipment. The geotechnical engineer, by field examination, can determine the extent of any undercutting or reconditioning necessary to prepare an adequate subgrade.

In the areas which are at grade or are to receive additional fill, we recommend that the upper 8 inches of existing material be scarified, moisture-conditioned and recompacted. We recommend a compaction criteria of 98% of the Standard Proctor maximum dry density (ASTM D 698) within a moisture content range of 2% of the soil's optimum moisture content.

8.4 CONTROLLED STRUCTURAL FILL

BECC recommends that the engineered fill at the site be free of organics and debris, and rocks greater than six inches in size. Structural fills should be composed of soils with a liquid limit less than 50 and a plasticity index of 30 or less, and have a maximum dry density of greater than 100 pcf. General fill should be compacted to a minimum 98 percent of maximum dry density, as determined by the Standard Proctor ASTM D 698. A sufficient number of field density tests should be performed to evaluate the grading contractor's performance during filling. During mass grading, lift thickness for fill should be limited to a maximum of eight inches loose measure. Backfilling in limited access areas such as utility trenches should have a lift thickness limited to six inches loose measure.

It is also recommended that all structural fill be placed within 2 percent of optimum moisture content. The grading contractor should acknowledge the importance of proper fill moisture conditioning. **We suggest that the project specifications address that both fill compaction and acceptable fill moisture content will be required for the acceptance of structural fills.** It will be particularly important to have a water truck available if filling takes place during the hot, dry summer months.

8.5 BACKFILLING OF UTILITY TRENCHES

Backfilling of storm drain and utility trenches is often accomplished in an uncontrolled manner, leading to subsequent settlement of the fill and cracking of pavements. It is recommended that utility trenches be backfilled with acceptable fill in six inch lifts and compacted with pneumatic-piston tampers to the project requirements. Should seepage occur in utility trenches, it may be necessary to "floor" the trench with open-graded gravel to provide a dry working surface.

8.6 SURFACE DRAINAGE & PROTECTION OF SOILS DURING GRADING

The soils at the site are moisture sensitive and can become easily disturbed causing loss of strength. Proper surface drainage will be very important during grading at the site. If the soils become wet after being exposed it may become necessary to undercut or recondition. On many projects reworking of disturbed soils becomes a point of controversy. We recommend that the specifications for this project provide performance guidelines for protection of exposed soils and correction of disturbed areas.

9.0 PRELIMINARY FOUNDATION RECOMMENDATIONS

The preliminary recommendations stated in the following sections are based on the data obtained through our exploration and experience with similar structures and subgrade conditions. Once final grades and building loads are available to BECC, additional subsurface exploration may be required to provide final foundation recommendations.

In our opinion, the existing fill and alluvial soils at the site are not suitable for foundation support of buildings. We have provided the following foundation options for the site.

9.1 OPTION 1 – SHALLOW SPREAD FOUNDATIONS ON NEW COMPACTED STRUCTURAL FILL

This will require all of the existing fill soils be removed and replaced with compacted engineered fill (meeting requirements of Section 8.4 of this report) within 10 feet of buildings. Based on the information from the test pits, the existing fill soils extended to depths of approximately 15 feet below the existing ground surface. This option will require considerable site excavation. If this option is selected, we recommend a maximum net allowable bearing pressure of 3,000 psf for foundation design. This bearing pressure can be increased one-third, in accordance with the local practice to resist transient loading conditions associated with seismic events or wind loads. Spread foundations supported in new structural fill will be limited to a maximum column of 400 kips in order to control foundation settlement to 1 inch or less.

9.1.1 Spread Foundation Construction

The following items should be included in the project specification in regard to foundation design and construction.

1. We recommend minimum footing dimensions of 18 and 24 inches for continuous strip footings and individual column footings, respectively.

2. The footing bearing surface should be observed by a BECC representative to verify that the soil complies with the above recommendations. We recommend that the soils exposed in the foundation bottoms, be compacted to a minimum of 98% of the Standard Proctor maximum dry density (ASTM D 698).

3. During field observations, it may be necessary to lower the bearing elevation in order to reach a suitable bearing stratum. Also, it will be necessary to adjust the footing depth in the event that pockets of soils are found during field observation by the project geotechnical engineer.

4. Where it is necessary to extend a footing beyond the planned bearing depth in order to reach a suitable bearing level, the over-excavation should be backfilled with lean concrete or compacted engineered lean clay fill and the footing can be constructed at the planned bearing elevation.

5. If water is encountered in the footing excavations, extreme care should be exercised to ensure that the foundation subgrade is not disturbed. A thin concrete “mud mat” poured over surfaces should be used to protect them from any seepage that might enter foundation excavations.

6. The base of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as disturbance from rain, frost, or flooding. Surface runoff water should be drained away from the excavation and not be allowed to pond.

7. If possible, all footing concrete should be poured during the same day the excavation is made. If this is not possible, then the footing excavation should be adequately protected.

8. Backfill adjacent to exterior walls should be composed of clean soil fill meeting the project fill requirements. No debris or rubble should be placed adjacent to the exterior walls. Fill should be compacted immediately after placement to preclude surface water infiltration into the foundation materials. Water must not be allowed to pond above newly constructed foundations because the integrity of the bearing soils could be compromised and building settlement could result.

9. Gutters, downspouts, leader pipes, and splash blocks should be used to carry roof drainage away from the structures. Roof runoff should discharge at least five feet away from buildings in unpaved areas. Exterior grades should be sloped away from the building to achieve positive drainage of surface water. Twelve inches of vertical fall in 10 feet of horizontal distance is often used as a guideline for the grade of slopes next to buildings in unpaved areas.

9.2 OPTION 2- DRIVEN H-PILES (DEEP FOUNDATION SYSTEM)

Structures at the site could be supported by driven H-piles in order to transfer loads below the poor existing fill soils in the "old pond". Driven H-piles is a deep foundation system constructed by driving steel piles into the ground until proper bearing or design depth is achieved. In general, steel driven piles systems work by utilizing wall skin friction and end bearing, depending on subsurface conditions and structural design. The piles at this site should be driven to practical refusal bearing on natural bedrock.

The following recommendations are made with regard to pile design and specification:

TYPE PILE	**H-Pile:** HP 12x53
PILE POINT	Associated Pile & Fitting Corp. HP-77750-B or HP-77600-B
DRIVING HAMMER	Energy of 25,000 to 35,000 ft. lbs.
DRIVING CRITERIA	Practical refusal 5 blows with ¼" movement or less
DESIGN CAPACITY	Downward: 70 tons maximum
PILE SPACING	Minimum of 36 inches center to center is recommended
PILE SPLICING	Maximum 2 per pile with full penetration weld or approved splicer for developing the moment capacity of pile.
MONITORING	All pile driving should be monitored by a BECC representative.

9.3 ESTIMATED ADDITIONAL FOUNDATION EXPENSE

The cost of the building foundation would depend on the size and location of the building on the site. Any portion of the building located in the area of the "old pond" will need to be undercut or supported by a deep foundation system. The following estimates are based on a 10,000 s.f. building footprint located directly over the "old pond". We note that BECC's estimates are based on our experience with similar projects and the owner should get detailed pricing from reputable contractors.

Option 1: Remove and Replace

The cost to remove and replace unsuitable fill is generally approximately $30 per cubic yard. This cost would be less if the unsuitable soils could be wasted on-site and suitable fill soil material could be found on-site. For a 10,000 s.f. building located directly over the former pond the additional cost for remove and replace is estimated to be approximately $100,000 to $200,000.

Option 2 – Driven H-Piles (HP 12x53)

The cost to install steel H-Piles is approximately $50 per linear foot of steel pile installed. For a 10,000 s.f. building located directly over the former pond the additional foundation cost for the H-Piles would be between $200,000 and $300,000.

10.0 FLOOR SLAB SUPPORT

It is our opinion that the floor slab for the building can be built on-grade, achieving support from new controlled engineered fill. We recommend floor slab be supported on a minimum of 3 feet of new compacted fill soils in the area of the "old pond". A modulus of subgrade reaction (k for a 1 square foot bearing plate) value of 150 pci is recommended for floor slab design. We recommend that the floor slab be isolated from the walls and foundations.

BECC recommends soils in floor slab areas be compacted to a minimum of 98% of the Standard Proctor maximum dry density (ASTM D 698). We recommend a minimum of 4 inches of ALDOT No. 57 stone or 6 inches of ALDOT No. 610 stone be placed above the final subgrade in floor slab areas in order to act as a capillary break. Prior to any fill placement or floor slab construction, it is recommended that the exposed sub-grade materials be evaluated by a BECC representative. This evaluation may include proofrolling with a triaxle dump truck. Any soft or unstable areas will require undercutting and replacement with compacted engineered fill.

On most projects, there is a significant time lag between initial grading and the time when the contractor is ready to construct the slab-on-grade. Even though the soils may have been placed and compacted adequately during initial grading, exposure to weather, construction traffic, etc., can destroy the integrity of subgrade soils. On many projects, this becomes a point of controversy when remedial work is required for proper slab support. Prior to the construction of concrete slabs, the subgrade should be evaluated by a BECC representative. This evaluation may include proofrolling. We suggest that provisions be included in the project specifications for the contractor to restore the sub-grade soils to an acceptable condition, (as discussed in this report) prior to the construction of slabs. Such restoration may include moisture conditioning of the surficial soils and recompaction to the project requirements.

11.0 PAVEMENT DESIGN

We recommend the pavement subgrade soils should be scarified, moisture conditioned and compacted to 98% of their Standard Proctor maximum dry density within 2% of the soil's optimum moisture content. The following recommendations assume that the traffic in the paved areas will consist of primarily passenger automobiles. The following pavement designs are based on a California Bearing Ratio (CBR) value of 6.

The asphalt pavement sections described herein were designed using the AASHTO "Structural Number" (SN) System. The traffic intensities used in pavement design calculations are as follows:

PAVEMENT CLASSIFICATION	TRAFFIC INTENSITY
Light Duty (Cars Only)	300 cars per day
Medium Duty	300 cars and 10 trucks per day
Heavy Duty	300 cars and 100 trucks per day

If the traffic intensity is different from the above, BECC should be given this information to modify our recommendations, if needed. Pavement sections were designed using the 1993 AASHTO design system and substituting materials based upon "structural equivalency coefficients" from the Alabama State Highway Department as follows:

MATERIAL	STRUCTURAL EQUIVALENCY COEFFICIENT
Asphalt Binder and Surface	0.54
Crushed Aggregate Base	0.14

All subgrade, base, and pavement construction operations and materials should meet minimum requirements of the Alabama Department of Transportation "Standard Specifications for Highway Construction", 2012 edition. The applicable sections of the specifications are identified as follows:

TITLE	ALDOT Specification Section
Soil, Soil Aggregate, and Aggregate, Base and Subbases	301
Hot Mix Asphalt Pavements	410
Superpave Bituminous Concrete Base, Binder, and Wearing Surface Layers	424
Portland Cement Concrete Pavement	450
Materials	800

Recommended Design Pavement Section – (CBR = 6)

LIGHT DUTY PAVEMENT (Cars Only)	1" - Bituminous Concrete Wearing Surface Layer ALDOT 424-A, 1/2 inch Max. Size Aggregate, ESAL Range A/B 2" - Bituminous Concrete Binder Layer ALDOT 424-B, 1 inch Max. Size Aggregate, ESAL Range A/B 6" - Crushed Aggregate Base ALDOT 825 Type B	FLEXIBLE
	5" - Portland Cement Concrete Pavement ALDOT 450 (f'c = 4000 psi, Mr =580 psi) 4" - Crushed Stone Base ALDOT 825, Type B	RIGID

MEDIUM DUTY PAVEMENT (Cars + 10 Trucks/day)	1" - Bituminous Concrete Wearing Surface Layer ALDOT 424-A, 1/2 inch Max. Size Aggregate, ESAL Range A/B 2.5" - Bituminous Concrete Binder Layer ALDOT 424-B, 1 inch Max. Size Aggregate, ESAL Range A/B 8" - Crushed Aggregate Base ALDOT 825 Type B FLEXIBLE 6" - Portland Cement Concrete Pavement ALDOT 450 (f'c = 4000 psi, Mr =580 psi) 4" - Crushed Stone Base ALDOT 825, Type B RIGID
HEAVY DUTY PAVEMENT (Cars + 100 Trucks/day)	1.5" - Bituminous Concrete Wearing Surface Layer ALDOT 424-A, 1/2 inch Max. Size Aggregate, ESAL Range C/D 3" - Bituminous Concrete Binder Layer ALDOT 424-B, 1 inch Max. Size Aggregate, ESAL Range C/D 12" - Crushed Aggregate Base ALDOT 825 Type B FLEXIBLE 9" - Portland Cement Concrete Pavement ALDOT 450 (f'c = 4000 psi, Mr =580 psi) 4" - Crushed Stone Base ALDOT 825, Type B RIGID

In concrete paving, reinforcing steel is typically not necessary if a liberal joint pattern is used in design, and proper workmanship is conducted. Construction joints should not exceed a spacing of 30 times the concrete thickness. Therefore, a joint spacing no greater than 12.5 feet for 5 inch thick concrete pavement, 15 feet for 6 inch thick concrete pavement and 22 feet for 9 inch thick concrete pavement.

We recommend that pavement subgrades be compacted to a minimum of 98% of the Standard proctor maximum dry density within 2% of the soil's optimum moisture content.

Typically during construction, pavement subgrades become disturbed because of traffic and environmental conditions. Prior to construction of pavements, it is essential that the subgrade be restored to a properly compacted condition. The specifications should include notes pertaining to subgrade restoration immediately prior to pavement construction. The on-site soils have a tendency to lose shear strength (and consequently pavement support capability) if they are permitted to dry, and are later exposed to free water. Thus, proper moisture conditioning of the subgrade prior to placement of the pavement base cause will result in better pavement performance. Restoration of pavement subgrade should be addressed in the project specifications.

11.1 GENERAL PAVEMENT CONSIDERATIONS

All pavement materials and installation procedures should meet the Alabama Department of Transportation (*ALDOT*) specifications. Typically during construction, pavement subgrades become disturbed because of traffic and environmental conditions. Prior to construction of pavements, it is essential that the subgrade be restored to a properly compacted condition. The specifications should include notes pertaining to subgrade restoration immediately prior to pavement construction. The on-site soils have a tendency to lose shear strength (*and consequently pavement support capability*) if they are permitted to dry, and are later exposed to free water. Thus, proper moisture conditioning of the subgrade prior to placement of the pavement base cause will result in better pavement performance.

12.0 CONSTRUCTION MONITORING

We strongly recommend that **Birmingham Engineering and Construction Consultants, Inc.** be retained to provide a comprehensive construction-monitoring program when the project proceeds. This program would assist the owner in determining that the work is being carried out in general conformance with the plans and specifications and help avoid the potential of change orders and cost overruns. Construction monitoring includes testing of construction materials such as compacted fill and concrete. Also included is engineering observation during the site preparation, foundation and wall construction phases of the project.

Monitoring/testing during the earthwork and foundation construction phases is particularly important since assumptions (and recommendations) have been made based on the test pit data. Confirmation that actual subsurface conditions are comparable to the assumed conditions is an essential part of the subsurface exploration process.

12.1 SUBGRADE OBSERVATION, PROOFROLLING

The purpose of proofrolling will be to densify the exposed near-surface soils and also to reveal soft pockets of soil that will require remedial measures. Areas that pump or rut during the proofrolling operations should be undercut or reconditioned. The geotechnical engineer can determine the depth and extent of areas that will require undercutting.

12.2 FILL MONITORING

We recommend that in-place density tests should be performed in the field by an engineering technician to evaluate the contractor's performance with regard to meeting the project specifications for fill placement. A commonly used testing frequency is one test per eight to twelve inch lift to fill placed per 2,500 square feet of fill area. The engineering technician can assist the grading contractor in soil moisture content evaluation by performing on-site fill moisture content tests.

12.3 FOUNDATION EXCAVATIONS

We recommend that the excavations for foundations be observed and tested by a BECC representative. Such testing is necessary to determine the appropriateness of the bearing level, the adequacy of the bearing materials and the conformity of the foundation to the specification with respect to depth, planned dimensions, cleanliness, etc.

12.4 PLACEMENT OF PAVEMENT & DENSE-GRADE BASE

We recommend that the placement of dense-grade base and pavement be observed and tested by a BECC geotechnical engineer or engineering technician. Such testing is necessary to determine the appropriateness of the compaction of material to conform to the specifications and recommendations set forth herein.

13.0 GENERAL REMARKS/REPORT LIMITATIONS

This report has been prepared for the exclusive use of **Jason Rogoff and Corporate Realty Associates, Inc.** for specific application to the subject project. All recommendations contained in this report have been made in accordance with generally accepted soil and foundation engineering practices. No other warranties are implied or expressed. In addition, the analysis and recommendations submitted in this report are based in part upon the data obtained from the test pits. The nature and extent of variations between the test locations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

We emphasize that this report was for design purposes only and is not sufficient to prepare an accurate bid. Contractors reviewing this report should acknowledge that the recommendations and discussions herein are for design purposes.

If significant changes are made in the character of the proposed development, a consultation should be arranged to review them with respect to prevailing subsurface conditions. At that time, it may be necessary to submit supplementary recommendations.

It is imperative that the geotechnical engineer be provided the opportunity to review the final plans and specifications to verify that the recommendations in this report are properly interpreted and incorporated in the design. It will be the client's responsibility to furnish the final grading and foundation plans to BECC for the necessary review. If the geotechnical engineer is not accorded the privilege of making this recommended review, we can assume no responsibility for misinterpretation of our recommendations.

APPENDIX

Test Pit Location Map
Test Pit Logs with Laboratory Results
Geotechnical Lab Summary
Photographic Log

BECC
Geotechnical, Materials, and Environmental Engineers

NOTE: Test Pits were located in the field by BECC. Map was obtained from Google Earth and modified for illustrative purposes by BECC. Locations should be considered approximate on this map.

200 100 0 200

BECC
Geotechnical, Materials, and Environmental Engineers

1032 Grants Mill Road Irondale, Alabama	**Test Pit Location Map**	BECC Project No.: 217033	DATE: 06/07/17
	Scale: 1 inch = 200 feet	Map Sheet Sheet 1 of 1	

BECC,INC
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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-1 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Medium stiff to stiff dark gray brown sandy CLAY with some rock fragments and constuction debris up to 2 feet in diameter (timbers, brick, concrete, asphalt, etc.)								Test Pits were located in the field by a BECC representative
						GB 1	4.5	13.9					
907.5	2.5												
						GB 2	1.5						No groundwater encountered at time of investigation
905.0	5.0		A-2-6	SC		GB 3	4	16.4	33	16	22.9		
					Test pit refusal at 6' due to concrete fragments								

Test Pit refusal at 6.0 feet

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PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-2 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Very stiff dark gray brown sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	2.5						
907.5	2.5												
					RESIDUUM: Very stiff red tan sandy CLAY with some rock fragments	GB 2	3	15.6					No groundwater encountered at time of investigation
905.0	5.0					GB 3	3	16.0					

Test Pit terminated at 6.0 feet

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TEST PIT NUMBER TP-7 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Medium stiff to soft dark red brown sandy CLAY with some rock fragments and constuction debris up to 2 feet in diameter (gravel, brick, concrete, asphalt, etc.)								Test Pits were located in the field by a BECC representative
						GB 1	1.25						
907.5	2.5												
						GB 2	0.25						No groundwater encountered at time of investigation
905.0	5.0					GB 3	1	20.5					
						GB 4	0.5						
902.5	7.5												
						GB 5	0.25	15.9					
900.0	10.0				FILL: Stiff dark gray brown sandy CLAY with some rock fragments and constuction debris up to 6 inches in diameter (concrete, asphalt, etc.)								
						GB 6	2.5						
897.5	12.5												
						GB 7	2.5						
895.0	15.0												

Test Pit terminated at 15.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-8 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Stiff dark gray brown sandy CLAY with some rock fragments and constuction debris up to 6 inches in diameter (concrete, asphalt, etc.)								Test Pits were located in the field by a BECC representative
						GB 1	2						
907.5	2.5												
						GB 2	1						
905.0	5.0				ALLUVIUM: Loose gray silty SAND	GB 3	3						
			A-6	SC		GB 4	2.5	18.3	31	11	37.2		
902.5	7.5												
					ALLUVIUM: Loose gray silty SAND with rock fragments	GB 5	4						
900.0	10.0												Groundwater encountered at 10 feet at time of investigation
						GB 6	2	18.8					
897.5	12.5												
						GB 7	2						
895.0	15.0												

Test Pit terminated at 15.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-9 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Medium stiff dark gray brown sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	1	15.0					
907.5	2.5												
					RESIDUUM: Stiff red tan sandy CLAY with some rock fragments	GB 2	1						No groundwater encountered at time of investigation
905.0	5.0					GB 3	2.5	21.0					

Test Pit terminated at 5.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-10 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Stiff to medium stiff dark gray brown sandy CLAY with some rock fragments and constuction debris								Test Pits were located in the field by a BECC representative
						GB 1	1.5						
907.5	2.5												
						GB 2	2	16.3					
905.0	5.0					GB 3	1.5						
						GB 4	1.5	19.3					
902.5	7.5												
						GB 5	1						
900.0	10.0												Groundwater encountered at 10 feet at time of investigation
					FILL: Soft to stiff dark red brown sandy CLAY with some rock fragments and constuction debris (timbers, gravel, etc.)	GB 6	0.5						
897.5	12.5												
						GB 7	2						
895.0	15.0												

Test Pit terminated at 15.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-11 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				RESIDUUM: Stiff to medium stiff red tan sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	2.5						
907.5	2.5												
						GB 2	2						
905.0	5.0					GB 3	4	19.2					
						GB 4	1.5						
902.5	7.5												
						GB 5	1						
900.0	10.0												Groundwater encountered at 10 feet at time of investigation
						GB 6	1	19.8					
897.5	12.5				RESIDUUM: Medium dense dark brown clayey SAND with rock fragments								
						GB 7	1						
895.0	15.0												

Test Pit terminated at 15.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-12 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Stiff dark gray brown sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	4						
907.5	2.5												
					RESIDUUM: Soft to medium stiff red tan sandy CLAY with some rock fragments	GB 2	0.5	21.4					No groundwater encountered at time of investigation
905.0	5.0					GB 3	0.5						
						GB 4	3	21.4					
902.5	7.5												
						GB 5	1.5						
900.0	10.0												
						GB 6	3.5						
897.5	12.5												
						GB 7	4.5						
895.0	15.0												

Test Pit terminated at 15.0 feet

BECC,INC
360 Industrial Lane
Birmingham, Alabama 35211
Telephone: (205)941-1119
Website: www.beccinc.com

PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-13 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Medium stiff dark red brown sandy CLAY with some rock fragments and constuction debris								Test Pits were located in the field by a BECC representative
			A-2-6	SC		GB 1	1.5	12.3	27	12	21.8		
907.5	2.5												
					FILL: Loose dark brown clayey SAND with rock fragments	GB 2	0						No groundwater encountered at time of investigation
905.0	5.0					GB 3	0.5	17.7					
					FILL: Soft dark red brown sandy CLAY with some rock fragments and constuction debris								
						GB 4	3						
902.5	7.5				RESIDUUM: Stiff red tan sandy CLAY with some rock fragments								
						GB 5	3.5						
900.0	10.0												
						GB 6	3.5						
897.5	12.5												

Test Pit terminated at 12.5 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-14 **TEST PIT LOCATION** See Map

GEOLOGY Parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Stiff dark gray brown sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	4.5						
907.5	2.5												
						GB 2	2	18.3					No groundwater encountered at time of investigation
905.0	5.0					GB 3	0.5						
					RESIDUUM: Soft to medium stiff red tan sandy CLAY with some rock fragments								
						GB 4	1.5						
902.5	7.5												
						GB 5	4.5	22.3					
900.0	10.0												
						GB 6	4.5						
897.5	12.5												
						GB 7	4.5						
895.0	15.0												

Test Pit terminated at 15.0 feet

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PROJECT 1032 Grants Mill Road

PROJECT NO. 217033 **DATE COMPLETED** 6/2/17

TEST PIT NUMBER TP-15 **TEST PIT LOCATION** See Map

GEOLOGY parkwood Formation

ELEVATION 910 ft **EQUIPMENT** Takeuchi TB 2150

LOGGED BY J.Rivers **REVIEWED BY** R.Rhinehart

ELEVATION (ft)	DEPTH (ft)	GRAPHIC LOG	AASHTO CLASSIFICATION	USCS CLASSIFICATION	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	POCKET PENT. (TSF)	MOISTURE CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	FINES CONTENT (%)	WATER LEVEL	NOTES
910.0	0.0				FILL: Soft to stiff dark gray brown sandy CLAY with some rock fragments								Test Pits were located in the field by a BECC representative
						GB 1	0						
907.5	2.5												
						GB 2	2	19.9					No groundwater encountered at time of investigation
905.0	5.0					GB 3	3						
						GB 4	2.5	7.9					
902.5	7.5												
						GB 5	2.5						
					RESIDUUM: Stiff red tan sandy CLAY with some rock fragments								
900.0	10.0												
						GB 6	2						
897.5	12.5												

Test Pit terminated at 12.5 feet

BECC,INC
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Telephone: (205)941-1119
Website: www.beccinc.com

SUMMARY OF LABORATORY RESULTS

CLIENT Corporate Realty Associates, Inc.

PROJECT NAME 1032 Grants Mill Road

PROJECT NUMBER 217033

PROJECT LOCATION Irondale, Alabama

Borehole	Depth	Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	%<#200 Sieve	Classification (USCS)	Classification (AASHTO)	Dry Density (pcf)	Saturation (%)	Void Ratio
TP-1	1.00	13.9									
TP-1	5.00	16.4	33	17	16	22.9	SC	A-2-6			
TP-2	3.00	15.6									
TP-2	5.00	16.0									
TP-7	5.00	20.5									
TP-7	9.00	15.9									
TP-8	7.00	18.3	31	20	11	37.2	SC	A-6			
TP-8	11.50	18.8									
TP-9	1.00	15.0									
TP-9	4.75	21.0									
TP-10	3.00	16.3									
TP-10	7.00	19.3									
TP-11	5.00	19.2									
TP-11	11.50	19.8									
TP-12	3.00	21.4									
TP-12	7.00	21.4									
TP-13	1.00	12.3	27	15	12	21.8	SC	A-2-6			
TP-13	5.00	17.7									
TP-14	3.00	18.3									
TP-14	9.00	22.3									
TP-15	3.00	19.9									
TP-15	7.00	7.9									

LAB SUMMARY - GINT STD US LAB.GDT - 6/14/17 09:05 - C:\USERS\JMILLER152\SHAREPOINT\BECC TEAM SITE - 2017 GEOTECH PROJE\217033 GRANTS MILL ROAD DEVELOPMENT\GINT\1032 GRANTS MILL ROAD.GPJ

Test Pit 1 Excavation

Test Pit 2 Excavation

Test Pit 7 Excavation

Test Pit 8 Excavation

Test Pit 9 Excavation

Test Pit 10 Excavation

Test Pit 11 Excavation

Test Pit 12 Excavation

Test Pit 13 Excavation

Test Pit 14 Excavation

Test Pit 15 Excavation

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SECTION 02 41 13

SELECTIVE SITE DEMOLITION

P A R T 1 - G E N E R A L

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the demolition of site work and such features as required in these specifications and on the drawings. Included are the following topics:

PART 1 - General

- Scope
- Related Work
- Submittals
- Record Drawings
- Safety
- Permits
- Disconnection of Services
- Provisions for Future Work
- Removal/Salvaging of Items
- Owner Salvaged or Removed Materials
- References

PART 2 - Materials

Equipment

PART 3 - Execution

Protection of Existing Work and Facilities

Demolition

Demolition below Grade

Demolition Backfill

Transportation and Disposal of Demolition Waste

RELATED WORK

Applicable provisions of the General Conditions and Division 1 shall govern work under this section.

Section 02 00 00 – Existing Conditions

Section 31 25 00 – Erosion Control

SUBMITTALS

For utilities or other services requiring removal or abandonment in-place, submit materials documenting completion of such work.

Submit record drawings.

Submit copies of records documenting recycling or disposal of demolition materials from the site.

RECORD DRAWINGS

Maintain record drawings showing actual locations of utilities and other features encountered, and any deviations from the original design. Show actual limits of removal and demolition.

SAFETY

Verify that all gas and electrical utilities have been abandoned or disconnected and associated hazards mitigated, prior to beginning any demolition.

Maintain a clean and orderly site. Remove debris at end of each workday.

Burning of debris is not permitted.

If hazardous materials are not anticipated, but encountered, terminate operations and contact the OWNER'S Construction Representative immediately. Follow all applicable local, state and federal regulations pertaining to hazardous materials.

PERMITS

Contractor shall comply with all applicable federal, state, and local safety and health requirements regarding the demolition of structures and other site features as applicable. Unless otherwise noted, Contractor shall be responsible for obtaining and paying for all permits necessary to complete demolition work.

DISCONNECTION OF SERVICES

Prior to starting removal and/or demolition operations be responsible and coordinate disconnection of all existing utilities, communication systems, alarm systems and other services.

Disconnect all services in manner which insures continued operation in facilities not scheduled for demolition.

Disconnect all services in a manner which allows for future connection to that service.

Disconnect services to equipment at unions, flanges, valves, or fittings wherever possible.

PROVISIONS FOR FUTURE WORK

N/A

REFERENCES

Demolition and removal of sanitary sewer structures shall be in accordance with Mobile Area Water and Sewer System (MAWSS) requirements, specifically MAWSS Standard Specification Section 12.1.36 (Permanent Plugging and Abandoning Sewer Lines and Manholes) and related Sections.

REMOVAL/SALVAGING OF ITEMS

Carefully remove all items that are scheduled to be salvaged.

Secure salvaged items to allow for future movement; provide pallets, skids and other devices as necessary. Secure all loose parts.

Provide crates, padding, tarps and other measures necessary to protect salvaged items during storage. Store items in secure location, safe from vandalism, weather, dust and other adverse elements.

Where salvaged items are indicated to be turned over to Owner, deliver to location on property where designated by Owner. Where indicated to be incorporated into new work, store the salvaged item in secure location until trade responsible for re-installation mobilizes his equipment and storage facilities to the site, or otherwise accepts responsibility for the salvaged item.

OWNER SALVAGED OR REMOVED MATERIALS

SALVAGE ITEMS IN THIS PROJECT: Remove the existing gate at the driveway entrance and relocate as indicated in the construction plans.

P A R T 2 - M A T E R I A L S

EQUIPMENT

Contractor's equipment for demolition purposes must meet all safety requirements imposed on such equipment.

P A R T 3- E X E C U T I 0 N

GENERAL; PROTECTION OF EXISTING WORK AND FACILITIES

Contractor to request a utility location mark-out for the site and verify site conditions before proceeding with demolition work. Inspect structures and utilities prior to start of work and notify the Architect in writing of any discrepancies or hazardous conditions.

Take all measures necessary to safeguard all existing work and facilities which are outside the limits of the work.

Furnish and install fencing or other barriers as shown on the plans or as otherwise necessary to protect existing features.

Verify the locations of, and protect, any buildings, structures, paved surfaces, signs, streetlights, utilities, landscaping and all other such facilities that are intended to remain or be salvaged.

Make such explorations and probes as necessary to ascertain any required protection measures that shall be used before proceeding with demolition.

Provide and maintain adequate catch platforms, warning lights, barricades, guards, weather protection, dust protection, fences, planking, bracing, shoring, piling, signs, and other items required for proper protection. Provide protection for workmen, the public, adjacent construction, and occupants of existing building(s).

Report damage of any facilities or items scheduled for salvaging to the OWNER'S Construction Representative.

Repair or replace any damaged facilities that are not scheduled for demolition.

Explosives shall not be used for demolition.

Keep streets, walks and all other adjacent paved areas clean and swept clear of dirt, mud and debris deposited as a result of this operation.

Protect surrounding area from dust. Control rodents and other vermin associated with demolition operations.

DEMOLITION

Remove all equipment, fixtures and other materials scheduled for salvage prior to beginning demolition operations.

Demolish and remove all buildings and structures scheduled for demolition as shown on the plans.

Abandon utilities in accordance with Mobile Area Water and Sewer System (MAWSS) requirements.

Carry out vehicle loading as necessary within the project boundaries or as defined or indicated on the drawings, but not in locations that block vehicular traffic on the streets or pedestrian traffic on adjacent public walks.

Dismantle each structure in an orderly manner to provide complete stability of the structure at all times. Provide bracing and shoring where necessary to avoid premature collapse of structure.

Conduct demolition operations and the removal of rubbish and debris in such a way that a minimum of nuisance dust is caused. Constantly sprinkle rubbish and debris with water if necessary to keep nuisance dust to a minimum.

Where necessary to prevent collapse of any construction, install temporary shores, underpinning, struts or bracing. Do not commence demolition work until all temporary construction is complete.

Break up and remove concrete slabs-on-grade, unless otherwise shown to remain.

DEMOLITION BELOW GRADE

Demolish foundation walls and other below grade features in accordance with the plans. Unless otherwise noted, remove all below grade features to a point 4' below adjoining existing grade, or proposed grade, whichever is lower. Basement and/or lowest level floors more than 4' below existing grade need not be removed but must be broken up to permit drainage.

DEMOLITION BACKFILL

Backfill and compact below grade areas and voids resulting from demolition of structures and other abandonment and demolition.

Backfilling shall not begin until demolition and abandonment has been approved and documented by the OWNER'S Construction Representative.

Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen materials, trash and debris.

Backfill type, lift thickness and compaction requirements shall be in accordance with Section 31 20 00 – Earthmoving.

TRANSPORTATION AND DISPOSAL OF DEMOLITION WASTE

Transport and dispose all demolition waste in accordance with local, state, and federal guidelines.

Whenever possible, or otherwise required by the Contract Documents, recycle demolition waste.

Demolition waste shall be disposed of at a landfill or dumpsite designed and approved to accept the given waste.

Maintain records documenting recycling and disposal of demolition waste. Record description of material, date removed, quantity removed, method of transport and recycling/disposal destination.

END OF SECTION 02 41 13

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART ONE - 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 cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.

2. Foundation walls.

3. Slabs-on-grade.

4. Concrete toppings.

B. Related Sections:

1. Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

2. Division 2 Section "Cement Concrete Pavement" for concrete pavement and walks.

3. Division 2 Section "Decorative Cement Concrete Pavement" for decorative concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.

2. Admixtures.

3. Steel reinforcement and accessories.

4. Fiber reinforcement.

5. Bonding agents.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

D. Field quality-control reports.

E. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.

2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART TWO - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

C. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2.2 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II, gray. Supplement with the following:

a) Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: ASTM C 94/C 94M and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened

concrete. Do not use calcium chloride or admixtures containing calcium chloride.

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

2. Retarding Admixture: ASTM C 494/C 494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 WATERSTOPS

A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a) BoMetals, Inc.

   b) Greenstreak.

   c) Paul Murphy Plastics Company.

   d) Vinylex Corp.

2. Profile: Flat, dumbbell with center bulb.

3. Dimensions: 4 inches by 3/16 inch thick (100 mm by 4.75 mm thick) nontapered.

2.7 VAPOR RETARDERS

A. Bonded Underslab Vapor Barrier: See Section 07 2616

2.8 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

2.9 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.

2. Combined Fly Ash and Pozzolan: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: 5 inches (125 mm)], plus or minus 1 inch (25 mm).

4. Air Content: 4.5 percent, plus or minus 1.5 percent at point of delivery for 1-inch (38-mm) nominal maximum aggregate size.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength 3000 psi (20.7 MPa) at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.50.

3. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).

4. Air Content: 4.5 percent, plus or minus 1.5 percent at point of delivery for 1-inch (38-mm) nominal maximum aggregate size.

C. Interior Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

2. Maximum Water-Cementitious Materials Ratio: 0.45.

3. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m).

4. Slump Limit: 5 inches (125 mm)], plus or minus 1 inch (25 mm).

5. Air Content: For concrete surfaces that will be trowel-finished, do not air entrain concrete and do not allow entrapped air content to exceed 3 percent..

2.12 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.13 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART THREE - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and

construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.

2. Class C, 1/2 inch (13 mm) for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.

2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

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

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

C. Granular Course: Cover vapor retarder fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining

sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least [one-third] of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch

(3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.8 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

6. Coordinate all curing, finishing, repairing, patching, filling, etc. materials and methods with flooring manufacturer.

7. Confirm concrete is clean, smooth, and free of debris prior to installing flooring.

F. Where resilient flooring occurs, Prepare Concrete Substrates according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.

3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 11 pH

4. Moisture Testing: Proceed with installation only after substrates pass one of the following testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

   a) Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 7 lb of water/ 1000 sq ft in 24 hours.

b) Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 90 percent relative humidity level.

c) On substrates where both the Moisture Vapor Emission Rate and Percent Relative Humidity tests are conducted, results for both tests shall comply with the allowable limits listed above.

5. Where moisture content of concrete exceeds specified limits, install concrete crack filler and vapor emission treatment per Section 09 0560.

   a) After installation of vapor emission treatment and before flooring installation, conduct 72-hour bond test to verify adhesion of each required type of flooring adhesive to vapor emission treated slabs.

   b) Provide written report on such testing. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate

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

1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

H. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated.

2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm).

3. All concrete to receive flooring shall be finished with a single trowel finish only. Slab finish shall not be burnished.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.12 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If

removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

   a) Water.

   b) Continuous water-fog spray.

   c) Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

   a) Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

   b) Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

   c) Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing and Sealing Compound: No curing compounds of any kind may be used for concrete curing.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least [one] [six] month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose

particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

Testing: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

   a) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

   a) Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.

   b) A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

6. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

8. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.

10. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 03 30 00 - "Cast-In-Place Concrete"
2. Section 04 22 00 - "Unit Masonry"
3. Section 05 50 00 - "Metal Fabrications"
4. Section 07 62 00 - "Sheet Metal Flashing and Trim"
5. Section 07 90 00 - "Joint Protection"

1.2 SUMMARY:

A. This Section includes architectural precast concrete units, in shapes, configurations, sizes, and quantities as indicated on the Drawings, complete with all accessories indicated or otherwise required for proper and water-tight installation.

B. Architectural precast concrete includes the following:

1. Plain smooth-faced sand finish concrete units, in standard color selected by Architect.
2. Special formed units, where indicated.
3. Structural architectural precast concrete, where indicated.

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Complete current product data and instructions for manufactured materials and products. Include mix designs, certifications, and laboratory test reports as required.

    a. Include water absorption test reports for units with exterior exposure.

    b. Include integral and field applied water repellents.

    c. Include flashing materials.

2. Shop drawings prepared by or under supervision of a qualified professional engineer showing complete information for fabrication and installation of precast concrete units. Indicate member dimensions and cross-section; fabrication tolerances; location, size, and type of reinforcement, including special reinforcement; and lifting devices necessary for handling and erection. Shop drawings shall bear the required current seal of the responsible design engineer, for both the State where fabricated and the State of Alabama.

    a. Include erection procedure for precast units, sequence of erection, and erection tolerances, for all structural units, and as needed or requested for other units.

3. Show layout, dimensions, and identification of each precast unit corresponding to sequence and procedure of installation.

4. Indicate welded connections by AWS standard symbols. Detail inserts, connections, and joints, including accessories and construction at openings in precast units.

    a. Show grouted joints ("rigid" type), and caulked sealant joints, including in part, expansion joints ("soft" type).

5. Show location and details of anchorage devices to be embedded in other construction.

    a. Indicate protective finishes for metal items, including connectors.

6. For structural units, provide complete design calculations, including loads imposed on structure, prepared by a qualified professional engineer.

7. Samples for initial selection purposes:

    a. Submit color samples for all standard colors available for precast units, for initial selection.

    b. Submit color samples for each type of grout required.

c. Submit samples of cast-in gaskets, anchorages, and other attachments and accessories as requested by Architect.

8. Samples approximately 12-inches x 12-inches x 2-inches to illustrate quality, color, and texture of surface finish, following initial selections.

1.4 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except as otherwise indicated:

1. ACI 318, "Building Code Requirements for Reinforced Concrete."

2. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

3. Prestressed Concrete Institute MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

4. American Welding Society, "Structural Welding Code."

5. Standard Building Code.

B. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where project is located and the state where units are manufactured, and experienced in providing engineering services that have resulted in successful installation of architectural precast concrete units similar in material, design, and extent as required for this Project.

C. Fabricator Qualifications: Pre-approved firm having a minimum of 5-verifiable years successful experience in fabrication of architectural precast concrete units, similar to members required for this project, on at least 5-verifiable projects of similar size, scope, and complexity. Fabricator must have sufficient production capacity to produce, transport, and deliver required units without causing delay in the work.

1. Provide architectural precast units from one of the following, or other fabricator submitted with detailed data, history, qualifications, and samples, at least 10-days prior to original Bid Date and subsequently approved:

a. Arkansas Precast; Jacksonville, AK (501-982-1547)

b. Bluegrass Art Cast, Inc.; Winchester, KY (606-744-5481)

c. Castone Corp.; Opelika, Alabama (334-745-3571)

d. Gate Precast, Inc.; Monroeville, AL (334-575-2803)

e. Jackson Stone Co.; Jackson, MS (601-366-0902)

f. Miller-Mize Precast, Inc.; Columbus, GA; (706) 322-1311

g. Pineapple Grove Designs; Boynton Beach, FL (800) 771-4595

h. PRC Precast; Greenville, SC (706) 237-2771

i. Spring Precast LLC; Cobb, GA (229) 591-7009

D. Design modifications may be made only as necessary to meet field conditions and to ensure proper fitting of the work and only as acceptable to Architect. Maintain general design concept shown without increasing or decreasing sizes of members or altering profiles and alignment shown. Provide complete design calculations and drawings prepared by a professional engineer registered as indicated above, if design modifications are anticipated.

E. Erector Qualifications: Minimum of 3-years successful experience in erection of architectural precast concrete units similar to units required for this project.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver precast concrete units to project site in such quantities and at such times to assure continuity of installation. Store units at project site to prevent cracking, distorting, warping, staining, or other physical damage and so that markings are visible. Lift and support units only at designated lifting or supporting points as shown on final shop drawings.

PART 2 - PRODUCTS

2.1 FORMWORK:

A. Provide forms and, where required, form-facing materials of metal, plastic, wood, or other acceptable material that is nonreactive with concrete and will produce required finish surfaces.

B. Unless forms for plant-manufactured prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or to movement during detensioning.

2.2 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Epoxy-Coated Reinforcing Bars: ASTM A 775.

C. Galvanized Reinforcing Bars: ASTM A 767, Class II (2.0-ounce zinc psf), hot-dip galvanized after fabrication and bending, only where indicated and where recommended by the Fabricator's Design Engineer.

D. Steel Wire: ASTM A 82, plain, cold-drawn, steel. E. Welded Wire Fabric: ASTM A 185.

F. Welded Deformed Steel Wire Fabric: ASTM A 497.

G. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing.

1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

H. Provide plastic protected or stainless steel protected (similar to above) inserts, etc., for acceptance or installation of dowels, anchors, or other installation accessories.

I. Cast-in Weld Plates and Anchors: As designed and recommended by architectural precast manufacturer, for locations where indicated or otherwise required.

2.3 PRESTRESSING TENDONS:

A. Uncoated, 7-wire stress-relieved strand complying with ASTM A 416. Use Grade 250 unless Grade 270 indicated.

1. Strand similar to above but having size and ultimate strength of wires increased so that ultimate strength of the strand is increased approximately 15-percent, and with increased strength but with fewer number of wires per strand, may be used at manufacturer's option.

2.4 CONCRETE MATERIALS:

A. Portland Cement: ASTM C 150, Type I or Type III.

1. Use only one brand, type, and source of supply of cement throughout the project, unless otherwise acceptable to Architect.

2. Use white or other standard color portland cement for facing concrete mix to match

Architect's control sample.

a. Color Range: White to Cream or Beige, unless otherwise selected.

3. Standard gray portland cement may be used for nonexposed backup concrete.

B. Fine Aggregate for Facing Mixes: ASTM C 33; manufactured sand of same material as coarse aggregate, unless otherwise acceptable to Architect.

1. Use aggregate from same source as those used in Architect's accepted control samples.

C. Pigments: Nonfading, resistant to lime and other alkalies.

1. Provide integral color as selected by Architect, to match those in accepted control sample(s).

D. Water: Drinkable, free from foreign materials in amounts harmful to concrete and embedded steel.

E. Air-Entraining Admixture: ASTM C 260.

F. Water-Reducing, Retarding, or Accelerating Admixtures, (if any): ASTM C 494, type as selected by Fabricator and containing no chloride ions.

G. Integral Water Repellent: "For cast," as manufactured by W.R. Grace & Co., or pre-approved equivalent submitted at least 10-days prior to original Bid Date and subsequently approved.

2.5 CONNECTION MATERIALS:

A. Steel Plates: Structural quality, hot-rolled carbon steel, ASTM A 283, Grade C.

B. Steel Shapes: ASTM A 36.

C. Use below for critical and severe exposure, and for structural connections (clip angles, etc.).

1. Stainless Steel Shapes: AISI Type 302/304.

C. Anchor Bolts: ASTM A 307, low-carbon steel bolts, regular hexagon nuts and carbon steel washers.

D. Electrodes for Welding: Comply with AWS Code.

E. Finish of Steel Units: Exposed units, hot-dip galvanized after fabrication, ASTM A 153; inserts cast into precast units, hot-dip galvanized, electro-galvanized, or cadmium coated; others shop painted with rust-inhibitive primer.

2.6 GROUT MATERIALS:

A. For general use, except where indicated otherwise:

1. Cement Grout: Portland cement and clean, natural sand, ASTM C 404. Mix at ratio of 1.0-part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.

B. For structural units, units forming gutters, and where indicated or otherwise required:

1. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, portland cement, shrinkage compensating agents, and plasticizing and water-reducing agents, complying with CRD-C621.

a. Products: Subject to compliance with requirements, provide one of the following, in color selected by Architect:

1) "100 Non-Shrink Grout," Conspec Mktg. & Mfg. Co.

2) "Supreme Grout," Cormix.

3) "Sure Grip Grout," Dayton Superior.

4) "Euco N.S.," Euclid Chemical Co.

5) "Crystex," L & M Construction Chemicals, Inc.

6) "Masterflow 713," Master Builders, Inc.

7) "Sealtight 588 Grout," W.R. Meadows, Inc.

8) "Propak," Protex Industries, Inc.

9) "Set Non-Shrink," Set Products, Inc.

10) "Five Star Grout," U.S. Grout Corp.

B. Integral efflorescence control water repellent for exposed grout materials: "Dry Block," as manufactured by Forrer Industries of W.R. Grace & Co., or pre-approved equivalent submitted at least 10-days prior to original Bid Date and subsequently approved.

1. Coordinate with and provide same product used for Section 04 22 00 - "Concrete Unit Masonry".

2.7 PROPORTIONING AND DESIGN OF MIXES:

A. Prepare design mixes for each type of concrete required.

B. Design mixes may be prepared by independent testing facility or by qualified precast manufacturing plant personnel, at precast fabricator's option.

C. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the project for each type of concrete required, complying with ACI 318.

D. Facing Mix: Standard-weight concrete consisting of specified portland cement, aggregates, admixtures, and water to produce the following properties:

1. Compressive Strength: 5,000 psi minimum at 28-days.

2. Total Air Content: Not less than 4-percent nor more than 6-percent.

3. Water Absorption: Not to exceed 5-to-6-percent by weight, except between 3-to-4-percent for sloping surfaces (sills).

E. Backup Concrete: Standard-weight concrete with compressive strength of 5,000 psi at 28-days.

F. Submit written reports to Architect of proposed mix for each type of concrete at least 15-days prior to start of precast unit production. Do not begin concrete production until Architect has reviewed mixes and evaluations.

G. Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by Architect before using in the work.

H. Admixtures: Use air-entraining and water repellent admixture in strict compliance with manufacturer's directions. Admixtures to increase cement dispersion or provide increased workability for low-slump concrete may be used subject to Architect's acceptance.

1. Use amounts as recommended by admixture manufacturer for climatic conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain quality control.

2. Confirm compatibility of each product intended for use in writing from each manufacturer, prior to use. Submit to Architect for review and record.

2.8 CONCEALED FLASHING MATERIALS:

A. Product/Manufacturer: Elastic flashing specified in Section 07 62 00 - "Sheet Metal Flashing and Trim" (i.e.: Pre-approved equivalent to "Nervastral HD", 3 mils with smooth untextured finish on both sides).

2.9 FABRICATION:

A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and following dimensional tolerances, unless otherwise indicated.

B. Forms: Accurately construct forms mortar-tight and of sufficient strength to withstand pressures due to concrete placing operations, temperature changes, and, when prestressed, pretensioning and detensioning operations. Maintain form work to provide completed precast concrete units of shapes, lines, and dimensions indicated, within specified fabrication tolerances.

C. Dimensional Tolerances of Finished Units: Overall height and width measured at face adjacent to mold at time of casting:

1. 10-feet or less: Plus or minus 1/8-inch.

2. 10-feet to 20 feet: Plus 1/8-inch, minus 3/16-inch.

3. 20-feet to 30-feet: Plus 1/8-inch, minus 1/4-inch.

4. Each additional 10-feet: Plus or minus 1/16-inch per 10-feet.

5. Angular deviation of plane of side mold: 1/32-inch per 3-inches depth or 1/16-inch total, whichever is greater.

6. Openings within one unit: Plus or minus 1/4-inch, except plus or minus 1/8-inch for windows and door frames.

7. Out of square (difference in length of 2-diagonal measurements): 1/8-inch per 6-feet or 1/4-inch total, whichever is greater.

8. Thickness: Minus 1/8-inch, plus 1/4-inch.

9. Tolerances of other dimensions not otherwise indicated: Numerically greater of plus or minus 1/16-inch per 10-feet, or plus or minus 1/8-inch.

D. Position Tolerances: For cast-in items measured from datum line locations as shown on reviewed shop drawings:

1. Anchors and inserts: Within 3/8-inch of centerline location.

2. Blockouts and reinforcements: Within 1/4-inch of position shown on shop drawings, where such positions have structural implications or affect concrete cover; otherwise within plus or minus 1/2-inch.

E. Fabricate units straight, smooth, and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated.

1. Precast units that are warped, cracked, broken, spalled, stained, or otherwise defective will not be acceptable.

2. Provide openings for penetrations of work by others, including in part, downspouts.

F. Expansion Joints: Free of grout, mortar, or other obstructions to expansive movement, with expansion joint filler and sealant unless otherwise indicated, at all locations where indicated and where required by project conditions.

1. Sills: Midpoint between mullions, with expansion filler strip, unless indicated or required otherwise.

2. Copings: Every joint between units, unless otherwise indicated. Align joints with vertical expansion joints in adjacent work.

3. Mullions: Provide for expansion at top connectors to rigid building structural members.

G. Cast-In Items: Provide reglets, slots, holes, and other accessories in units to receive windows, cramps, dowels, reglets, waterstops, flashings, and other similar work as indicated.

1. Provide inserts and anchorages cast into units, for attachment of loose hardware as required.

H. Anchorages: Provide loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other miscellaneous steel shapes not provided by other trades, necessary for securing precast units to supporting and adjacent members.

I. Surface Finish: Fabricate precast units and provide exposed surface finishes as follows, at locations indicated on the Drawings for each type finish:

1. Smooth surface sand finish free of pockets, sand streaks, and honeycomb, with uniform color and texture to match Architect's control sample.

J. Sealer: Provide pre-mixed 20-percent silane solution with UV sensitive/fugitive dye, in water carrier when outdoor temperature is 70E or higher, and in water or alcohol carrier when temperature is between 45E and 70E; Two Coats; from a manufacturer with at least 5-years' experience in its manufacture and

use, for application to all exposed surfaces of architectural precast concrete work.

1. Coordinate with similar requirements for Section 04 22 00 - " Concrete Unit Masonry".

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Deliver anchorage items to be embedded in other construction before start of such work. Provide setting diagrams, templates, instructions, and directions as required for installation.

B. Do not install precast units until supporting concrete or masonry has attained minimum allowable design compressive strength.

1. Do not install precast units hung or otherwise supported by steel, until structure is fully braced, loaded, etc.

C. Install precast concrete members plumb, level, and in alignment within PCI MNL-117 and specified limits of erection tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as members are being permanently connected.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.

2. Install stainless steel dowels between precast units, into adjacent construction, etc., to assist and maintain alignment and anchorage.

D. Install flashing materials below all parapet caps, where composite wall air space is interrupted, and elsewhere as indicated or required.

E. Accessories: Install clips, hangers, and other accessories required for erection of precast units to supporting members and backup materials.

F. Anchor units in final position by bolting, welding, grouting, or as otherwise indicated. Remove temporary shims, wedges, and spacers as soon as possible after anchoring and grouting are completed.

1. At bolted connections use lock washers or other acceptable means to prevent loosening of nuts.

2. At welded connections apply rust-inhibitive coating on damaged areas, same as shop-applied material. Use high zinc content galvanizing repair coating on galvanized surfaces.

G. Cleaning: Clean exposed facings to remove dirt and stains on units after erection and completion of joint treatments. Wash and rinse in accordance with precast manufacturer's recommendations. Protect other work from damage due to cleaning operations. Do not use cleaning materials or processes that could change the character of exposed concrete finishes.

H. Seal joints in compliance with requirements of this Section 03 45 00 and Section 07 90 00 - "Joint Protection."

1. Verify compatibility of joint sealants with each manufacturer of admixtures and sealers, in writing prior to installation. Submit to Architect for review and record.

2. Provide adhesion testing for each joint condition and substrate prior to complete installation, where questionable conditions occur and when recommended by sealant manufacturer.

3.2 ERECTION TOLERANCES:

A. Warpage: Fabricate and install wall panels so that each panel after erection complies with following dimensional requirements:

1. Bowing (concave or convex) of any part of a flat surface not to exceed length of bow/360, with a maximum of 3/4-inch up to 30-feet.

2. Maximum warpage of one corner out of plane of other three, the greater of 1/16-inch per foot distance from nearest adjacent corner, or 1/8-inch.

B. Tolerances for Location of Precast Units: Fabricate and erect precast units so that joints between panels meet the following:

1. Face width of joints: Plus or minus 3/16-inch.

2. Joint taper: 1/40-inch per foot length, with maximum length of tapering in one direction of 10-feet.

3. Step in face: 1/4-inch.

4. Jog in alignment of edge: 1/4-inch.

5. Alignment for exterior panels is outside face.

6. Variation from plumb: Plus or minus 1/2-inch in any 40-foot run.

7. Variation from level: Plus or minus 1/2-inch in any 40-foot run.

3.3 PERFORMANCE REQUIREMENTS:

A. Conduct inspections, perform testing, and make repairs or replace unsatisfactory precast units as required.

1. Limitations as to amount of patching permitted are subject to acceptance by Architect.

B. In addition to above, in-place precast units may be rejected for the following:

1. Exceeding specified installation tolerances.

2. Damage during construction operations.

3. Surface finish deficiencies in exposed-to-view surfaces.

4. Other defects as listed in PCI MNL-117.

3.4 FINAL CERTIFICATION:

A. Submit certification of completed work from Manufacturer's on-site observer, that all work is in compliance with requirements.

END OF SECTION 03 45 00

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SECTION 04 21 13.13

BRICK VENEER MASONRY

PART 1-GENERAL

1.1 SECTION INCLUDES

A. Face brick units.

B. Cast stone ornaments set into brickwork.

C. Reinforcement, anchorage, and accessories

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

D. Section 05 50 00 — Metal Fabrications: Placement of loose steel lintels and fabricated steel items.

E. Section 07 71 00— Roof Specialties: Placement of anchors for extruded copings.

1.3 RELATED SECTIONS

A. Section 04 05 13 - Masonry Mortaring.

B. Section 04 22 00 - Concrete Unit Masonry.

C. Section 07 90 00 - Joint Protection: Rod & sealant at control joints.

1.4 REFERENCES

A. ANSI/SATM A82 - COLD-Drawn Steel Wire for Concrete Reinforcements.

B. ANSIJASTM C216 — facing Brick (Solid masonry units made from clay and shale).

C. ANSI/ASTM A525 — Steel Sheet, zinc coated, (galvanized) by the Hot-dip process.

D. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit four samples of face brick units and cast stone ornaments to illustrate color, texture, and extremes of color range.

C. Submit shop drawings of cast stone ornaments, indicate materials, construction dimensions, location, and installation details.

D. Submit manufacturers' certificate under provisions of Section 01 40 00 that products meet or exceed specified requirements.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this Section with minimum three years' experience.

1.7 MOCK-UP

A. Provide mock-up of complete wall system under provisions of Section 01 40 00. Locate near new west masonry exterior wall.

B. Mock-up shall include all elements of the wall, including concrete block, bituminous damp proofing, board insulation, wall ties, face brick and weep holes. Mock-up shall illustrate brick pattern, an exterior and interior corner, and a window jamb with partial window sill and sill flashing. as shown on drawings. Wall mock-up shall be approximately 4' high by 6' wide using each color brick in pattern shown on drawings, including specified mortar.

C. When accepted, mock-up will demonstrate minimum standard for the work. Mockup may not remain as part of the work. Remove mock-up upon completion of masonry work.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site. Store and protect products under provisions of Section 01 60 00.

B. Accept masonry units on site. Inspect for damage.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: IMAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.

PART 2-PRODUCTS

2.1 BRICK UNITS

A. Face Brick: All brick to be modular units, ANSI/ASTM C216, Type FBS, Grade MW; Basis of Design: Columbus Brick – Wakefield

B. Provide solid bricks and special shapes as required.

C. Texture and color as selected.

2.2 ANCHORAGE

A. Single wythe joint reinforcement: Ladder type, ASTM A82, equal to 'Dur-O-Wal' D/A 3200, hot-dipped galvanized finish. ASTM A 123, 3/16 ".

B. Multiple wythe joint reinforcement: Ladder-Eye type, ASTM A82, equal to 'Dur-O-Wal' DIA 3600, hot-dipped galvanized finish. ASTM A 123, 3/16 ".pintles or ties.

C. Veneer Anchors in gables, 12 gauge, ¾" x 9 "bent plate with reinforced deformations; galvanized; equal to 'Dur-O-Wal' D/A 207.1W Tri Tie.

D. Wire Wall Ties: 1/4 "diameter, galvanized steel, triangle ties, equal to Dur -o - wall D/A 107 — 708 as required.

2.3 FLASHINGS

A. Galvanized Steel: ASTM A525, 090 finish, 24-gauge core steel.

2.4 ACCESSORIES

A. Cleaning Solutions: Non-acidic, non-harmful to masonry work or adjacent materials.

B. Weep Holes: ¼" cotton weep rope; extend 12" vertical into cavity and attach to insulation board with roofing nails..

C. Cavity Vents: Equal to AA 224 as manufactured by AA Weir Products.

D. Control Joints/Soft Joints: Neoprene material cement fused joints, 3/8 "thick for control joints, 1/4 "thick for soft joints; Equal to Dur-O-Wal D/A 2015 and D/A 2010.

E. Building Paper: # 15 asphalt saturated felt.

F. Mortar Net: Equal to Dur-O-Wal, Mortar Net. Typical at all through wall flashing/weep locations.

PART 3-EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

C. Beginning of installation means installer accepts existing conditions.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied with other Sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimensions. Form vertical and horizontal joints to uniform thickness.

C. Lay brick units in running bond or Flemish bond as indicated on the drawings. Course with three brick units and three mortar joints to equal 8 inches. Form concave mortar joints.

3.4 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

C. Remove excess mortar as Work progresses.

D. Interlock intersections and external corners.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Isolate top joint of masonry from horizontal structural members with compressible joint filler.

H. Half or full units only at jambs; modular work coursed from top down.

3.5 WEEPS & VENTS

A. Install weep holes in veneer at 24 inches on center horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

B. Install cavity vents directly over weep holes at top of each cavity space and below shelf angles in veneer at 24 inches on center horizontally.

C. Install weeps at each corner of window openings for windows up to 30" wide. In addition, for windows 31" and larger, provide weep at center of window opening.

3.6 CAST ORNAMENTS

A. Install and anchor cast stone ornament in accordance with manufacturer's instructions.

3.7 ANCHORAGES

A. Install horizontal joint reinforcement 16 "oc; anchor to concrete block reinforcement.

B. Secure wall ties to stud framed back-up in gables and embed into masonry veneer at maximum 16 inches oc each way and around perimeter of openings, within 12 inches of openings.

3.8 MASONRY FLASHINGS

A. Extend flashings through veneer, turn up minimum 8 inches and seal to back-up.

B. Where indicated insert flashings into reglets to form tight fit Secure in place with wedges and seal flashing into reglet with sealant.

C. Lay end joints minimum 6 inches and seal watertight.

D. Use flashing manufacturers' recommended adhesive and sealer.

3.9 LINTELS

A. Install loose steel lintels over window openings and door openings.

B. Maintain minimum 8-inch bearing on each side of opening.

C. All lintels to be hot-dipped galvanized. Paint to match brick veneer, color to be selected by Architect.

3.10 CONTROL JOINTS

A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

B. Size control in accordance with Section 079000 for sealant performance.

3.11 TOLERANCES

A. Maximum variation from unit to adjacent unit: 1/32 inch.

B. Maximum variation from plane of wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum variation from plumb: ¼ inch per story non-cumulative; 1/2 inch in two stories or more.

D. Maximum variation from level coursing: 1/8 inch in 3 foot and ¼ inch in 10 feet; V2 inch in 30 feet

3.12 CUTTING AND FITTING

A. Cut and fit for conduit and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain Architects' approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Clean work under provisions of Section 017100.

B. Remove excess mortar and mortar smears.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operation.

F. Do not pressure wash Masonry

3.14 PROTECTION OF FINISHED WORK

A. Protect finished installation under provisions of Section 016000.

B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION 04 21 13.13

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SECTION 04 43 13

STONE MASONRY VENEER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Portland cement based manufactured stone veneer and trim.

B. Related Sections:

1. 04 22 00 – Concrete Unit Masonry
2. 06 10 00 - Rough Carpentry
3. 07 62 00 – Sheet Metal Flashing and Trim
4. 07 90 00 - Joint Protection

1.2 REFERENCES

A. American National Standards Institute (ANSI):

1. ANSI A118.4 Specifications for Latex-Portland Cement Mortar.

B. American Society for Testing and Materials (ASTM):

1. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
2. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
3. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar.
4. ASTM C 177 - Standard Test Method for Steady-State Head Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
5. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes.
6. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.

7. ASTM C 482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.

8. ASTM C 567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.

9. ASTM C 847 - Standard Specification for Metal Lath.

10. ASTM C 932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.

11. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

12. ASTM C 1032 - Standard Specification for Woven Wire Plaster Base.

13. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

C. International Code Council (ICC):

1. ER Report.

2. NES Report.

D. Underwriter's Laboratory (UL): Building Materials Directory.

1.3 SUBMITTALS

A. Reference Section 01 33 00 - Submittal Procedures; submit following items:

1. Product Data.

2. Samples:

a. Standard sample board consisting of small-scale pieces of veneer units showing full range of textures and colors.

b. Full range of mortar colors.

3. Verification Samples: Following initial sample selection submit “laid-up” sample board using the selected stone and mortar materials and showing the full range of colors expected in the finished Work; minimum sample size: 3 by 3 feet.

4. Quality Assurance/Control Submittals:

a. Qualifications:

1) Proof of manufacturer qualifications.

2) Proof of installer qualifications.

b. Regulatory Requirements: Evaluation reports.

c. Veneer manufacturer's installation instructions.

d. Installation instructions for other materials.

B. Closeout Submittals: Reference Section 01 70 00 – "Execution and Closeout Requirements"; submit following items:

1. Maintenance Instructions.

2. Special Warranties.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Member of the National concrete Masonry Association ncma.org and the International Association of Plumbing and Mechanical Officials (IAPMO) www.iapmo.org.

B. Source Limitations for Manufactured Stone: Obtain manufactured stone units through single source from single manufacturer.

C. Source Limitations for Raw Materials: Obtain ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each raw material.

D. Certification: Manufacturer's IAPMO evaluation report certifying that a qualifying inspection of the facilities manufacturing process has been successfully completed and manufacturer is in compliance with IAPMO operational standards and Acceptance Criteria for Precast Stone (AC 51).

1. Density: ASTM C 567, Standard Test Method for Density of Structural Lightweight Concrete.

2. Freeze/Thaw: ASTM C 666/666M, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

3. Compressive Strength: ASTM C 39, Standard Test Method Compressive Strength in Cylindrical Concrete Specimens.

4. Flexural Strength: ASTM C 348, Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.

5. Tensile Strength: ASTM C 190-85. Method of Test for Tensile Strength of Hydraulic Cement Mortars (Withdrawn 1990).

6. Absorption: IAPMO-ES AC 51 Section 8.2, "Absorption."

7. Thermal Properties: ASTM C518, Standard Test Method for Steady-state Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

E. Mock-Up:

1. Prepare 4 by 4-foot sample at a location on the structure as selected by the Architect. Use approved selection sample materials and colors. Include concrete block, bituminous damp-proofing and/or weather resistant barrier, metal lath, manufactured stone veneer and mortar.

2. Show penetrations, terminations, corner detail, mortar color and tooling.

3. Obtain Architect's approval.

4. Protect and retain sample as a basis for approval of completed manufactured stone work. Approved sample may not be incorporated into completed work. Remove mock-up upon completion of manufactured stone veneer work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Reference Section 01 60 00 "Product Requirements".

B. Store cementitious materials and metal lath on elevated platforms, under cover, and in a dry location. Do not use materials that have become damp.

C. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.6 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Maintain materials and ambient temperatures in area of installation at minimum 40 degrees F prior to, during, and for 48 hours following installation.

B. Cold-weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Do not use units containing visible frozen moisture. Do not use Calcium chloride or anti-freeze admixtures.

C. Hot-weather Requirements: if temperature exceeds 80 degrees F, additional water will be need to be added on the scratch-coated surface and the backs of the manufactured stone units being applied. Provide shade and/or frequent misting of the wall may be required. Consult with mortar manufacturer to determine of mortar mix hot weather mix options are available. Local building code hot weather methods should be followed.

1.7 WARRANTY

A. Lifetime Limited Warranty on Materials: Covers stone installed in accordance with manufacturer's written instructions and recommendations.

1. Provide new materials in lieu of defective materials.

1.8 EXTRA MATERIALS

A. Provide extra units in shapes, colors, and sizes employed.

1. Provide 5 percent of the coverage area for corners and flats.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ProVia
2. Eldorado Stone, LLC.
3. Rock Cast
4. Coronado Stone Products
5. or Approved Equal

2. 2 MATERIALS

A. Stone Veneer:

1. Basis of Design: Provia Stone

a. Pattern: Ledgestone

b. Color: Brighton

c. Include matching corner pieces.

2. Stone Accents:

a. Color: To be selected by Architect from Manufacturer's full color range

b. Texture: As shown on Drawings.

c. Provide stone accents at the following locations, or as indicated on the drawings:

1) Wall caps

2) Utility trim accents

3) Window Heads and sills

4) Peaked Wall capstones

B. Veneer Unit properties: Manufactured stone masonry units consisting of portland cement, lightweight aggregates, and mineral oxide pigments.

1. Compressive Strength: ASTM C 192 and ASTM C 39, 5 sample average: greater than 1,800 psi (12.4MPa).

2. Shear Bond: ASTM C 482: 50 psi (345kPa).

3. Water Absorption: UBC Standard 15-5: Less than 22 percent.

4. Freeze-Thaw Test: ASTM C 67: Less than 3 percent weight loss and no disintegration.

5. Thermal Resistance: ASTM C 177: 0.473 at 1.387 inches thick

C. Moisture Barrier: two-layers; ASTM D 226, Type 1, No. 15, non-perforated asphalt-saturated felt paper.

D. Reinforcing: ASTM C 847, 2.5lb/yd2 (1.4kg/m2) galvanized expanded metal lath complying with code agency requirements for the type of substrate over which stone veneer is installed.

E. Mortar:

1. Cement: Any cement complying with ASTM C 270.

2. Lime: ASTM C 207.

3. Sand: ASTM C 144, natural or manufactured sand.
4. Color Pigment: ASTM C 979, mineral oxide pigments.
5. Water: Potable.
6. Pre-Packaged Latex-Portland Cement Mortar: ANSI A118.4.

F. Bonding Agent: Exterior integral bonding agent meeting ASTM C 932

G. Sealer: Water based silane or siloxane masonry sealer, clear.

2.03 MORTAR MIXES

A. Standard Installation (Grouted Joints):

1. Mix mortar in accordance with ASTM C 270, Type N or S.

a. Add color pigment in grout joint mortar in accordance with pigment manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates upon which work will be installed.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

3.2 PREPARATION

A. Protection: Protect adjacent work from contact with mortar.

B. Surface Preparation: Prepare substrate in accordance with manufacturer's installation instructions for the type of substrate being covered.

3.3 INSTALLATION

A. Install and clean stone in accordance with manufacturer's installation instructions for Standard Installation (Grouted Joint) or Jointless/Dry-Stacked installation as specified above.

B. Apply sealer in accordance with sealer manufacturer's installation instructions.

3.4 CLEANING

A. Remove protective coverings from adjacent work.

B. Cleaning Veneer Units:

1. Wash with soft bristle brush and water/granulated detergent solution.

2. Rinse immediately with clean water.

C. Removing Efflorescence:

1. Allow veneer to dry thoroughly.

2. Scrub with soft bristle brush and clean water.

3. Rinse immediately with clean water; allow to dry

4. If efflorescence is still visible, repeat above procedure using a solution of 1-part household vinegar and 5 parts water.

5. Rinse immediately with clean water.

END OF SECTION 04 42 13

SECTION 04 72 00

CAST STONE MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Cast stone trim.
2. Cast stone water table
3. Cast stone wall caps

1.2 SUBMITTALS

A. Product Data: Include dimensions of individual components.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

C. Samples: For each color and texture of cast stone required.

D. Colored Mortar Samples: For each mortar color required.

E. Qualification Data: For manufacturer.

F. Material Test Reports.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, with sufficient production capacity to manufacture required units.

1. Manufacturer is a producing member of the Cast Stone Institute.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Architectural Cast Stone, Inc.
2. Cast Stone Systems, Inc.
3. Pineapple Grove Designs.
4. Eldorado Stone
5. Architectural Concrete Casting, Inc.
6. Coronado Stone
7. Owens Corning Pro Series
8. Southern Castings, Inc.
9. Provia
10. Or Approved Equal.

2.2 CAST STONE UNITS

A. Provide cast stone units complying with ASTM C 1364 using the vibrant dry tamp or wet-cast method.

1. Provide units that are resistant to freezing and thawing.
2. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
3. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
4. Provide drips on projecting elements, unless otherwise indicated.

B. Cure units by one of the following methods:

1. Cure units with steam in enclosed curing room at temperature of 105 deg F (41 deg C) or above and 95 to 100 percent relative humidity for 6 hours.

2. Cure units with dense fog and water spray in enclosed warm curing room at 95 to 100 percent relative humidity for 24 hours.

3. Cure units to comply with one of the following:

   a. Not less than 5 days at mean daily temperature of 70 deg F (21 deg C) or above.

   b. Not less than 6 days at mean daily temperature of 60 deg F (16 deg C) or above.

   c. Not less than 7 days at mean daily temperature of 50 deg F (10 deg C) or above.

   d. Not less than 8 days at mean daily temperature of 45 deg F (7 deg C) or above.

C. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

D. Colors and Textures: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

A. Anchors and Dowels: Hot-dip galvanized steel.

B. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner complying with requirements in Division 4 Section "Unit Masonry Assemblies" and approved for intended use by cast stone manufacturer and approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.4 MORTAR

A. Comply with requirements in Division 4 Section "Unit Masonry Assemblies" for mortar materials and mixes. Select one mortar type in each subparagraph below. The Cast Stone Institute recommends Type N.

   1. For setting mortar, use Type S N.

   2. For pointing mortar, use Type N O.

   3. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required.

2.5 SOURCE QUALITY CONTROL

A. Employ an independent testing agency to sample and test cast stone units according to ASTM C 1364.

PART 3 EXECUTION

3.1 SETTING CAST STONE IN MORTAR

A. Install cast stone units to comply with requirements in Division 4 Section "Unit Masonry Assemblies."

B. Set units in full bed of mortar with full head joints, unless otherwise indicated.

1. Fill dowel holes and anchor slots with mortar.

2. Fill collar joints solid as units are set.

3. Build concealed flashing into mortar joints as units are set.

4. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.

5. Keep joints at shelf angles open to receive sealant.

C. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

D. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

F. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated. Keep joints free of mortar and other rigid materials.

G. Prepare joints indicated to receive sealant and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 90 00 "Joint Protection."

3.2 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

A. Set cast stone units accurately in locations indicated with edges and faces aligned.

1. Install anchors, supports, fasteners, and other attachments to secure units in place.

2. Shim and adjust anchors, supports, and accessories.

B. Fill anchor holes with sealant. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.

C. Set cast stone supported on clip or continuous angles on resilient setting shims. Hold shims back from face of cast stone a distance at least equal to width of joint.

D. Keep joints free of mortar and other rigid materials. Remove temporary spacers from joints after anchors and supports are secured in place and cast stone units are anchored.

E. Prepare joints and apply sealant of type and at locations indicated to comply with applicable requirements in Division 7 Section "Joint Sealants."

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except due to warpage of units.

3.4 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

1. Replace units in a manner that shows no evidence of replacement.

B. In-Progress Cleaning: Clean cast stone as work progresses.

1. Remove mortar fins and smears before tooling joints.

2. Remove excess sealant immediately, including spills, smears, and spatter.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone to comply with requirements in Division 4.

END OF SECTION 04 72 00

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART ONE - 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. Structural steel.
2. Grout.

B. Related Sections:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
3. Division 5 Section 055100 "Metal Stairs."
4. Division 9 Painting Sections.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360

B. Moment Connections: Type PR, partially restrained.

C. Construction: Combined system of moment frame and braced frame.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand critical welds.
8. Additional information required per the general notes in the structural drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Shear stud connectors.
3. Shop primers.
4. Nonshrink grout.

F. Source quality-control reports.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.9 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART TWO - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles , Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Weight Class: Standard.
2. Finish: Black except where indicated to be galvanized.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers with plain finish.

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

C. Unheaded Anchor Rods: ASTM A 36/A 36M.

1. Configuration: Hooked.
2. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.

4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
5. Finish: Plain.

D. Headed Anchor Rods: ASTM F 1554, Grade 36, straight.

1. Nuts: ASTM A 563 (ASTM A 563M) hex carbon steel.
2. Plate Washers: ASTM A 36/A 36M carbon steel.
3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
4. Finish: Plain.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according SSPC-SP 3, "Power Tool Cleaning."

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels shelf angles and welded door frames attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be[tested and] inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART THREE - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

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

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M[and AWS D1.8/D1.8M] for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

   a) Liquid Penetrant Inspection: ASTM E 165.
   b) Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c) Ultrasonic Inspection: ASTM E 164.
   d) Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting"Section 099123 "Interior Painting."

END OF SECTION 05 12 00

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SECTION 05 22 00

STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes steel joists for roof framing. Types of joists required include the following:

1. K-Series Open Web Steel Joists.

B. Refer to Division 3 Sections for installation of anchors set in concrete.

C. Refer to Division 4 Sections for installation of anchors set in masonry.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data and installation instructions for each type of joist and accessories.

1. Include manufacturer's certification that joists comply with SJI "Specifications" and SJI Plant certification.

C. Shop drawings showing layout of joist members, special connections, joining and accessories. Include mark, number, type, location and spacing of joists and bridging.

1. Provide templates or location drawings for installation of anchor rods and metal bearing plates.

D. Design Calculations: Submit for record one copy of design calculations, sealed by an engineer registered in the state where the project is located, for joist with cantilevers or concentrated loads or joist sizes for which standard load tables are not applicable.

1.4 QUALITY ASSURANCE

A. General: Provide joists fabricated in compliance with Steel Joist Institute (SJI) "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with American Welding Society (AWS) "Structural Welding Code - Steel," AWS D1.1.

C. Inspection: Inspect joists in accordance with SJI "Specifications."

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle steel joists as recommended in SJI "Specifications." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI "Specifications" for chord and web sections.

B. Steel Bearing Plates: ASTM A 36.

C. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.

D. Steel Prime Paint: Comply with SJI "Specifications."

2.2 FABRICATION

A. General: Fabricate steel joists in accordance with SJI "Specification."

B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.

C. Extended End: Provide extended ends on joists where indicated, complying with SJI "Specifications" and load tables.

D. Ceiling Extension: Provide ceiling extensions in areas having ceilings attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of

finished wall surface, unless otherwise indicated.

E. Top Chord Extension: Provide top chord extensions ("R" type) on joists where indicated, complying with SJI "Specifications" and load tables.

F. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with SJI "Specifications."

1. Provide bridging anchors for ends of bridging lines terminating at walls or beams.

G. End Anchorage: Provide end anchorages, including steel bearing plates, to secure joists to adjacent construction, complying with SJI "Specifications."

H. Header Units: Provide header units to support tail joists at openings in floor or roof system not framed with steel shapes.

I. Shop Painting: Remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories before application of shop paint.

1. Apply one shop coat of steel prime paint to joists and accessories, by spraying, dipping, or other method to provide a continuous dry paint film thickness of not less than 0.50 mil.

PART 3 - EXECUTION

3.1 ERECTION

A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings, and as herein specified.

B. Anchors: Furnish anchor rods, steel bearing plates, and other devices to be built into concrete and masonry construction.

C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.

D. Provide temporary bridging, connections, and anchors to ensure lateral stability during construction.

1. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.

E. Bridging: Install bridging simultaneously with joist erection, before construction

loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.

F. Fastening Joists: Comply with the following:

1. Field weld joists to supporting steel framework and steel bearing plates where indicated in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.

2. Bolt joists to supporting steel framework in accordance with SJI "Specifications" for type of joists used.

   a. Use unfinished threaded fasteners for bolted connections, unless otherwise indicated.

G. Touch-Up Painting: After joist installation, wire brush welded areas, abraded or rusty surfaces, and clean with solvent. Paint field-applied bolt heads and nuts and prepared surfaces on joists and steel supporting members. Use same type of paint as used for shop painting.

END OF SECTION 05 22 00

SECTION 05 3100
STEEL DECKING

PART ONE - 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. Roof deck.

B. Related Requirements:

1. Division 3 Section "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete

2. Division 5 Section "Structural Steel Framing" for shop- and field-welded shear connectors.

3. Division 5 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART TWO - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Consolidated Systems, Inc.; Metal Dek Group.

2. Epic Metals Corporation.

3. New Millennium Building Systems, LLC.

4. Nucor Corp.; Vulcraft Group.

5. Roof Deck, Inc.

6. Valley Joist; Subsidiary of EBSCO Industries, Inc.

7. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G60 (Z180) zinc coating.

2. Deck Profile: As indicated.

3. Profile Depth: As indicated.

4. Design Uncoated-Steel Thickness: As indicated.

5. Span Condition: Triple span or more.

6. Side Laps: Overlapped.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile indicated.

G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.

H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.

I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch (1.52 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

K. Galvanizing Repair Paint: ASTM A 780.

PART THREE - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 ROOF-DECK INSTALLATION

A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:

1. Weld Diameter: 3/4 inch (19 mm), nominal.

2. Weld Spacing: as indicated.

B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18 inches (457 mm), and as follows:

1. Fasten as indicated on the structural drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

1. End Joints: Lapped 2 inches (51 mm) minimum.

D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

SECTION 054000 - COLD-FORMED METAL FRAMING

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. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Ceiling joist framing.
4. Soffit framing.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for masonry shelf angles and connections.
2. Section 092116.23 "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.
3. Section 092216 "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Research Reports: For non-standard cold-formed steel framing, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency, or in-house testing with calibrated test equipment indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. AllSteel & Gypsum Products, Inc.
2. CEMCO; California Expanded Metal Products Co.
3. ClarkDietrich Building Systems.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Manufacturing, Inc.

6. Marino\WARE.
7. MRI Steel Framing, LLC.
8. Nuconsteel, A Nucor Company.
9. SCAFCO Corporation.
10. Steel Construction Systems.
11. United Metal Products, Inc.

2.2 PERFORMANCE REQUIREMENTS

1. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

   a. Upward and downward movement of 1/2 inch.

2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

B. Cold-Formed Steel Framing Design Standards:

1. Floor and Roof Systems: AISI S210.
2. Wall Studs: AISI S211.
3. Headers: AISI S212.
4. Lateral Design: AISI S213.

C. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

D. 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.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content 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: ST33H.
2. Coating: G60, A60, AZ50, or GF30.

C. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: 33.
2. Coating: G60.

2.4 LOAD-BEARING WALL FRAMING

A. 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: 0.0329 inch 0.0428 inch 0.0538 inch 0.0677 inch 0.0966 inch.
2. Flange Width: As Indicated.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0677 inch.
2. Flange Width: 1-1/4 inches.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch.
2. Flange Width: 1-5/8 inches.

2.5 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. 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: As Indicated.
2. Flange Width: 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: 1-1/4 inches.

C. 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.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Super Stud Building Products, Inc.; <Insert product name or designation> or comparable product by one of the following:

    a. ClarkDietrich Building Systems.
    b. Marino\WARE.
    c. Simpson Strong-Tie Co., Inc.
    d. Steel Network, Inc. (The).

D. 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 loads and transfer them to the primary structure, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch 0.0538 inch 0.0677 inch 0.0966 inch.
2. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications <Insert dimension>.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.6 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, punched with enlarged service holes, punched with standard holes, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch 0.0428 inch 0.0538 inch 0.0677 inch 0.0966 inch.
2. Flange Width: 1-5/8 inches 2 inches 2-1/2 inches, minimum.
3. Section Properties: <Insert minimum allowable calculated section modulus, moment of inertia, and allowable moment>.

2.7 SOFFIT FRAMING

A. Exterior Soffit Frame: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch 0.0428 inch 0.0538 inch 0.0677 inch 0.0966 inch.
2. Flange Width: 1-5/8 inches 2 inches 2-1/2 inches, minimum.
3. Section Properties: <Insert minimum allowable calculated section modulus, moment of inertia, and allowable moment>.

2.8 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.9 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel headless, hooked bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.10 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.11 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by no fewer than three exposed screw threads.

4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.

B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that are required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

C. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: As shown on Shop Drawings.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically as indicated on Shop Drawings. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches deep.

J. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: As indicated.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

a. Install solid blocking at centers indicated on Shop Drawings.

2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.6 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.7 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 03 30 00 - "Cast-in-Place Concrete"
2. Section 04 22 00 - "Concrete Unit Masonry"
3. Section 05 40 00 - "Cold-Formed Metal Framing"
4. Section 05 51 00 - "Metal Stairs"
5. Section 05 52 00 - "Metal Railings"
6. Section 06 10 00 - "Rough Carpentry"
7. Section 09 90 00 - "Paints & Coatings"

1.2 DESCRIPTION OF WORK:

A. Work described in this section includes metal fabrications, which include items made from iron and steel or aluminum shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere. Types of work in this section includes metal fabrications for:

1. Rough hardware.
2. Loose bearing and leveling plates.
3. Loose steel lintels.
4. Miscellaneous framing and supports.

5. Bollards (galvanized steel pipe with galvanized domed cap, concrete fill, paint, etc. Minimum 36-inches height unless other height is specifically indicated on the Drawings).

6. Temporary elevator hoist / support beams

7. Ladders at any attic hatches and roof hatches, and elsewhere as indicated.

1.3 QUALITY ASSURANCE:

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 PERFORMANCE REQUIREMENTS:

A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.5 SUBMITTALS:

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.

1. Show fabrication and installation details. In addition to applicable requirements above, include plans, elevations, sections, and details of connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.

C. Samples: Submit representative samples of materials and finished products as may be requested by Architect.

1.6 PROJECT CONDITIONS:

A. Field Measurements: Where fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting acceptable to fabricator's professional engineer, and in a manner that will not affect structural performance, deflection, safety, etc.

1.7 COORDINATION:

A. Coordinate installation of anchorages for metal fabrications and supports. 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, without delaying the work of this section or the Work of the project.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

B. Ferrous Metals:

1. Steel Plates, Shapes and Bars: ASTM A 36.

2. Steel Bar Grating: ASTM A 569 or ASTM A 36.

3. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.

4. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.

5. Galvanized Structural Sheet Steel: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.

6. Steel Pipe: ASTM A 53; Type and grade (If applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

7. Gray Iron Castings: ASTM A 48, Class 30.

8. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.

9. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

10. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

C. Non-Ferrous Metals:

1. Aluminum Drawn Seamless Tube: ASTM B 483, 6063-T832.

2. Aluminum Castings: ASTM B 26, 356.0-T6.

3. Aluminum Plate and Sheet: ASTM B 209, 6061-T6.

D. Grout: Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE-CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

E. Fasteners:

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Anchors at exterior walls, and preservative pressure treated (P.T.) and fire-retardant treated wood shall be hot-dip galvanized steel or Type 304 stainless steel.

F. Paint:

1. Metal Primer Paint: Southern Coatings "Heavy Duty RIP Primer 1-0900", Tnemec A10-99 Primer", or approved equivalent.

2. Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09 90 00 - "Paintings & Coatings".

3. Galvanizing Repair Paint: High zinc dust content paint for re-galvanizing welds in galvanized steel, complying with Military Specifications MIL-P-21035 (Ships), or SSPC-Paint-20.

4. Bituminous Paint: Cold applied asphalt mastic complying with SSPC Paint 12, except containing no asbestos fibers or cold applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL:

A. Workmanship:

1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32-inch unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown, or if not shown, Phillips flat-head (countersunk) screws or bolts.

5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

7. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

B. Galvanizing: Provide a zinc coating for those items shown or specified to be galvanized, as follows:

1. ASTM A 153 for galvanizing iron and steel hardware.

2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars, and strip 1/8-inch thick and heavier.

3. ASTM A 386 for galvanizing assembled steel products.

C. Shop Painting:

1. Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

2. Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.

D. Surface Preparation:

1. Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specification and environmental exposure conditions of installed metal fabrications, except where otherwise recommended in current written instructions and recommendations of paint manufacturer for the substrates to be painted:

a. Exterior (SSPC Zone 1B): SSPC-SP6 "Commercial Blast Cleaning."

b. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning."

2.3 ROUGH HARDWARE:

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.

B. Fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.4 LOOSE BEARING AND LEVELING PLATES:

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

2.5 LOOSE STEEL LINTELS:

A. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8-inches bearing at each side of openings, unless otherwise shown.

1. Galvanize all loose steel lintels in exterior walls.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS:

A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

B. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24-inches o.c. and provide minimum anchor units of 1-1/4-inches wide x 1/4-inch x 8-inch long steel straps.

D. Galvanize exterior miscellaneous frames and supports.

2.8 LADDERS - GENERAL:

A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated.

1. Comply with requirements of ANSI A14.3, unless otherwise indicated.

2. For attic access ladders, comply with ASME A17.1.

3. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c., with welded or bolted brackets, made from same metal as ladder.

2.9 STEEL LADDERS:

A. General: Fabricate ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply with requirements of ANSI A14.3, unless otherwise indicated.

B. Siderails: Continuous, steel, 1/2 by 2-1/2-inch (12-mm by 64-mm) flat bars, with eased edges, spaced 18 inches (460 mm) apart, unless otherwise indicated.

C. Bar Rungs: 3/4-inch (19-mm) diameter steel bars, spaced 12 inches (300 mm) o.c., unless otherwise indicated.

D. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.

E. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet (1.5 m) o.c. with welded or bolted steel brackets.

1. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches (180 mm).

2. Extend side rails 42 inches (1.1 m) above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, gooseneck the extended rails back to the structure to provide secure ladder access.

F. Provide nonslip surfaces on top of each rung, either by coating the rung with aluminum-oxide granules set in epoxy-resin adhesive, or by using a type of manufactured rung that is filled with aluminum-oxide grout.

G. Galvanize ladders, including brackets and fasteners at exterior locations.

H. Finishes: Shop applied prime paint, 2 coats, for all components. Refer to Section 09 90 00 – "Paintings & Coatings", for finish painting, not the work of this Section 05 50 00.

1. All anchors, anchorage components, etc., shall be hot-dipped galvanized steel.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete insets, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION:

A. General:

1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip-galvanized after fabrication, and are intended for bolted or screwed field connections.

B. Field Welding: Comply with AWS Code for procedures of manual shielded metal arc welding, appearance and quality of welds made, and methods used in correcting welding work.

C. Setting Loose Plates:

1. Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

2. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use non-metallic, non-shrink grout.

3. Pack grout solidly between bearing surfaces and plates to insure that no voids remain.

3.3 ADJUST AND CLEAN:

A. Touch up Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same materials as used for shop painting.

2. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply galvanized repair paint to comply with ASTM A 780.

END OF SECTION 05 50 00

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 05 40 00 – "Cold-Formed Metal Framing"

2. Section 05 50 00 – "Metal Fabrications"

4. Section 06 20 00 - "Finish Carpentry"

5. Section 06 40 00 - "Architectural Woodwork"

6. Section 07 31 13 – "Asphalt Shingles: Shingles over sheathing"

1.2 SUMMARY:

A. This Section includes the following, at locations indicated on the Drawings or otherwise required by project conditions:

1. Framing with dimension lumber.

2. Framing with engineered wood products (if any).

3. Wood grounds, nailers, and blocking; Preservative pressure treated when in association with roofing and any other exterior work.

4. Sheathing (plywood).

5. Framing anchors and miscellaneous accessories.

6. Air infiltration barrier over all exterior wood sheathing (roofs, walls, etc.)

1.3 DEFINITIONS:

A. Rough carpentry includes carpentry work not specified as part of other Sections and generally not exposed, unless otherwise specified.

1.4 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for the following products, as applicable to the work of this project:

1. Air infiltration barrier.

2. Metal framing anchors.

3. Plywood sheathing.

4. Construction adhesives.

5. Engineered wood products.

C. Material certificates for dimensional lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use as well as design values approved by the Board of Review of American Lumber Standards Committee.

D. Wood treatment data as follows including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:

1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.

2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

3. Warranty of chemical treatment manufacturer for each type of treatment.

E. Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction evidencing compliance of the following wood products with specified requirements and building code in effect for Project.

1. Engineered wood products.
2. Air infiltration barriers.
3. Metal framing anchors.

F. Additional information as needed to clarify materials, installation requirements, etc., upon request by the Architect or Engineer.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar materials.

1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

B. Refer to Division 1 Sections "Summary of Work" and "Special Conditions" for additional information and requirements regarding stored materials.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL:

A. Lumber Standards: Furnish lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies and Standards: Inspection agencies and standards and the abbreviations used to reference them with lumber grades and species include the following:

1. AFPA - American Forest and Paper Association (formerly NFPA)
2. AITC - American Institute of Timber Construction
3. AWPA - American Wood Preservers Association
4. AWPB - American Wood Preservers Bureau
5. NLGA - National Lumber Grades Authority (Canadian).

6. SPIB - Southern Pine Inspection Bureau.

7. TPI - Truss Plate Institute.

8. WCLIB West Coast Lumber Inspection Bureau.

9. WWPA Western Wood Products Association.

C. Grade Stamps: Provide lumber with each piece factory-marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber furnish pieces with grade stamps applied to ends or back of each piece; or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.

2. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.

2.2 DIMENSION LUMBER:

A. For light framing provide "Stud," or "Standard" grade lumber for stud framing (2 to 4 inches thick, 2 to 4 inches wide, 10 feet and shorter) and "Standard" grade for other light framing (2 to 4 inches thick, 2 to 6 inches wide), and as follows:

1. Southern Yellow Pine graded under SPIB rules, No 2 or better.

B. For structural light framing (2 to 4 inches thick, 2 to 4 inches wide), provide the following grade and species:

1. "No. 2" grade, Stress Rated, with the following minimum properties:

a. Fb = 1,150 psi.

b. E = 1,500,000 psi.

2. Species: Southern yellow pine or approved equivalent.

C. For structural framing (2 to 4 inches thick, 5 inches and wider), provide the following grade and species:

1. Same as indicated above for structural light framing.

2.3 BOARDS:

A. Concealed Boards: Where boards will be concealed by other work, provide lumber of 19 percent maximum moisture content (S-DRY or KD-19) and of following species and grade:

1. Southern Pine No. 2 boards per SPIB rules, or any species graded construction boards per WCLIB, or WWPA rules.

2.4 MISCELLANEOUS LUMBER:

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light-framing-size lumber of any species or board-size lumber as required. "No. 3 Common" or "Standard" grade boards per WCLIB or WWPA rules or "No. 2 Boards" per SPIB rules.

2.5 CONSTRUCTION PANELS, GENERAL:

A. Construction Panel Standards: Comply with DOC PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108.

1. Oriented Strand Board: Comply with DOC PS 2.

B. Trademark: Furnish construction panels that are each factory- marked with APA trademark evidencing compliance with grade requirements.

2.6 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS:

A. General: Where construction panels are indicated for the following concealed types of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade

designation, span rating, exposure durability classification, edge detail (where applicable), and thickness.

B. Wall Sheathing: APA RATED SHEATHING, Veneer Core Plywood.

1. Exposure Durability Classification: EXTERIOR.

2. Span Rating: As required to suit stud spacing indicated.

3. Thickness: 5/8 inch (nominal), unless otherwise indicated, or as required to match thickness of any contiguous gypsum or other sheathing.

C. Roof Sheathing: APA RATED SHEATHING, Veneer Core Plywood.

1. Exposure Durability Classification: EXPOSURE 1.

2. Span Rating: As required to suit rafter spacing indicated.

a. 40/20 minimum, unless otherwise indicated.

b. Thickness: 5/8 inch at sloped roofs and where required at parapet walls, unless otherwise indicated; 3/4-inch at any roofing substrates with less than 3:12 slope.

D. Subflooring/Horizontal Sheathing (on joists or rafters): APA RATED SHEATHING, Veneer Core Plywood; Tongue-and-Groove Edges.

1. Exposure Durability Classification: EXPOSURE 1.

2. Grade:

a. Below Carpet and at Attics: B-C, minimum.

b. Below Vinyl Floor Coverings: A-C, minimum.

3. Span Rating: As required to suit rafter/joist spacing indicated.

a. 40/20 minimum, unless otherwise indicated.

4. Thickness: 3/4 inch, unless greater thickness is otherwise indicated.

2.7 CONSTRUCTION PANELS FOR BACKING:

A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade designation, APA C-D PLUGGED EXPOSURE 1, in thickness indicated, or, if not otherwise indicated, not less than 3/4 inch.

2.8 AIR INFILTRATION BARRIER:

A. Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

2.9 FASTENERS:

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, and in area of high relative humidity provide fasteners with a hot-dip zinc coating per ASTM A 153, or in contact with preservative pressure treated (P.T.) wood or fire-retardant treated wood, of AISI Type 304 or 316 stainless steel.

B. Nails, Wire, and Brads: FS FF-N-105.

C. Power Driven Fasteners (screws): National Evaluation Report NER-272.

D. Wood Screws: ANSI B18.6.1.

E. Lag Bolts: ANSI B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.10 METAL FRAMING ANCHORS:

A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:

1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.

2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.

B. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G90 and with ASTM A 446, Grade A (structural quality); ASTM A

526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.

1. Use galvanized steel framing anchors for rough carpentry exposed weather, in ground contact, or in area of high relative humidity, and all other locations, and at every point of bearing.

2. Minimum Thickness: 18-gauge.

2.11 MISCELLANEOUS MATERIALS:

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturer.

B. Intermediate Supports for any Square-edge Roof Sheathing (if any): Mill finish aluminum H-clip type supports/spacers, with flat top at roof side, internal "points" for pushing into sheathing to prevent sliding or dislodgement, of size required for sheathing thickness, and in compliance with referenced standards.

2.12 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS:

A. General: Where lumber is indicated as preservative- treated wood or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber). Mark each treated item with the AWPB or SPIB Quality Mark Requirements.

B. Pressure-treat above-ground items with water-borne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to a maximum moisture content, respectively, of 19 percent and 15 percent. Treat indicated items and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

3. Wood framing members less than 18 inches above grade.

   a. Exception: Not required above treated bottom plate for framing which is bearing on concrete floor slab on grade.

4. Wood floor plates installed on concrete slabs or directly in contact with earth.

C. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

2.13 ENGINEERED WOOD PRODUCTS:

A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that evidence compliance with building code in effect for Project.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.14 COMPOSITE NAIL BASE INSULATED ROOF SHEATHING (at Gymnasium only):

A. Vented, Oriented-Strand-Board-Surfaced, Polyisocyanurate-Foam Sheathing: Rigid, cellular, polyisocyanurate thermal insulation complying with ASTM C 1289, Type II, Class 1, with exterior oriented strand board adhered to one face, felt facers each side, and 1-1/2 inches high spacers adhered and mechanically attached to support roof deck above. Provide with 1-1/2 inches high panel end closures and supports at eaves, roof openings and similar conditions.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atlas Roofing Corporation.

2. Cornell Corporation.

3. Dow Chemical Company (The).

4. Johns Manville; Berkshire Hathaway Inc.

5. Rmax, Inc.

C. Polyisocyanurate-Foam Thickness and Thermal Resistance: 1 inch, R-value = 6.5 (LTTR).

D. Oriented-Strand-Board Nominal Thickness: 7/16 inch (11.1 mm) to 1/2 inch (12.5 mm).

E. Spacers: Wood furring strips or blocks not less than 1-1/2 inches (38 mm) thick and spaced not more than 16 inches (400 mm) o.c., such that air can move from roof edge to ridge within the assembly.

F. Application: Waterproofing underlayments and felts (Section 07600), over vented, nail-base insulation system, factory assembly, with 1-1/2" wood blocking / ventilation space from continuous edge / soffit vent up to ridge vent, and 5/8" C-D T&G exterior plywood roof decking / sheathing, all over galvanized steel roof decking; With joint tape seal at joints, and panel end closures and supports to eliminate voids other than for ventilation from low vented drip edge to ridge vent.

1. Eave Style Soffit Vent: Preapproved equivalent to "S-400", as manufactured by Cor-A-Vent, Inc.; Mishwaka, IN; Phone: 1-800-837-8368; Website: www.cor-a-vent.com; unless specifically indicated otherwise on the Drawings.

G. Refer to Section 07 62 00 "Sheet Metal Flashing and Trim" for vented and non-vented drip edge.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.2 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS:

A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.

C. Install permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

3.3 WOOD FRAMING, GENERAL:

A. Framing Standard: Comply with A.F.P.A. "Manual for Wood Frame Construction", unless otherwise indicated.

B. Install framing members of size and spacing indicated, or if not indicated, to comply with referenced standard.

C. Anchor and nail as shown, and to comply with the following:

1. Published requirements of manufacturer of metal framing anchors.

2. "Fastening Schedule," of the International Building Code.

D. Fire stop concealed spaces of wood framed walls and partitions at each floor level and at the ceiling line of the top story. Where fire stops are not automatically provided by the framing system used, use closely fitted wood blocks of nominal 2-inch-thick lumber of the same width as framing members.

3.4 STUD FRAMING:

A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Install single bottom plate and double top plates using 2-inch thick members whose widths equal that of studs. Nail or anchor plates to supporting construction, as indicated and as required by applicable codes and standards, authorities having jurisdiction, and project conditions.

1. Anchor bottom plats to concrete slabs with at least 2-inch diameter galvanized anchor bolts with nuts and washers at 4'-0" o.c. (minimum) and otherwise as required by code and project conditions.

2. For exterior walls install 2-inch by 6-inch wood studs spaced 24 inches o.c., unless otherwise indicated.

3. For interior partitions and walls install 2-inch by 4-inch wood studs spaced 16 inches o.c., unless otherwise indicated.

4. The extent of wood stud framing, if any, is indicated on the Drawings.

B. Construct corners and intersections with not less than 3 studs. Install miscellaneous blocking and framing as shown and as required for support of facing materials, fixtures, specialty items, and trim.

1. Install continuous horizontal blocking row at mid-height of single-story partitions over 8 feet high and at midpoint of multi-story partitions, using 2-inch thick members of same width as wall or partitions.

C. Frame openings with multiple studs and headers. Install nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.

1. For nonbearing partitions, install double-jamb studs and headers not less than 4 inches deep for openings 3 feet and less in width, and not less than 6 inches deep for wider openings.

2. For load-bearing partitions, install double-jamb studs for openings 6 feet and less in width, and triple-jamb studs for wider openings. Install headers of depth shown, or if not shown, as recommended by A.F.P.A. "Manual for Wood Frame Construction".

D. Install diagonal bracing in stud framing of exterior walls, except as otherwise indicated. Brace both walls at each external and internal corner, full story height, at a 45-degree angle, using either a let-in 1 by 4 or 2 by 4 blocking or metal diagonal bracing. Omit bracing where following types of sheathing are indicated.

1. Plywood sheathing or corner bracing, 8-feet-wide panels, vertically, at each face of any wall framing at corners.

3.5 FLOOR JOIST FRAMING:

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Attach floor joists as follows:

1. To wood supporting members with wood ledgers as shown, or if not shown, with galvanized metal joist hangers, sized for framing members and loads.

B. Fire-cut members built into masonry.

C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 4 feet.

D. Do not notch in middle third of joists; limit notches to 1/6-depth of joist, 1/3 at ends. Do not bore holes larger than 1/3-depth of joist or locate closer than 2 inches from top or bottom. Install solid blocking (2 inches thick by depth of joist) at ends of joists unless nailed to header or bearing member.

E. Lap members framing from opposite sides of beams, girders or partitions not less than 4 inches or securely tie opposing members together. Install solid blocking (2 inches thick by depth of joist) over supports.

F. Anchor members paralleling masonry with 1/4-inch by 1-1/4-inch metal strap anchors spaced not more than 8 feet o.c. Extend anchors at least 4 inches into masonry, turn up 4 inches and extend over and fasten to 3 joists.

G. Under jamb studs at openings, install solid blocking between joists.

H. Under non-load-bearing partitions, install double joists separated by solid blocking equal to depth of studs above.

I. Install bridging of type indicated below between joists where nominal depth-to-thickness ratio exceeds 6, at intervals of 8 feet, and elsewhere as indicated.

1. Solid wood bridging 2 inches thick by depth of joists, end nailed to joists.

3.6 RAFTER AND CEILING JOIST FRAMING:

A. Ceiling Joists: Install ceiling joists with crown up and to comply with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where principal ceiling joists are at right angles to rafters, frame as indicated with additional short joists from wall plate to first joist; nail to ends of rafters and to top plate and nail to long joists or anchor with framing anchors or metal straps. Install 1 by 8 or 2 by 4 stringers spaced 4 feet o.c. crosswise over principal ceiling joists.

B. Rafters: Notch to fit exterior wall plates and toe nail. Provide metal framing anchors at bearing points. Double rafters to form headers and trimmers at openings in roof framing (if any), and support with metal hangers. Where

rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, install valley rafter of size shown, or if not shown, twice the thickness of regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against valley rafter.

2. At hips, install hip rafters of size shown, or if not shown, of same thickness as regular rafters and 2 inches deeper. Bevel ends of jack rafters for full bearing against hip rafters.

C. Install collar beams (ties) as shown, or if not shown, install 1-inch by 6-inch boards between every third pair of rafters. Locate below ridge member, one-third of distance to ceiling joists. Cut ends to fit slope and nail to rafters.

D. Install special framing as shown for eaves, overhangs, dormers and similar conditions, if any.

3.7 INSTALLATION OF CONSTRUCTION PANELS:

A. General: Comply with applicable recommendations contained in Form No. E30, "APA Design/Construction Guide - Residential & Commercial," for types of construction panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Roof Sheathing and Wall Sheathing: Nail to wood framing and screw to metal framing.

2. Subfloor Sheathing: Glue and screw to supports.

3. Plywood Backing Panels, if any: Nail to wood supports; toggle-bolt or expansion bolt anchors to masonry back-up, and screw to metal framing.

C. Intermediate Supports: Provide H-clip spacers at midpoints between supports for any square-edge roof sheathing, which are otherwise unsupported.

3.8 AIR INFILTRATION BARRIER:

A. Cover exterior sheathing with air infiltration barrier as follows:

1. Apply asphalt-saturated organic felt horizontally with 2-inch overlap and 6-inch endlap; fasten to sheathing with corrosion-resistant staples, or round-head corrosion-resistant nails installed through 1-inch minimum diameter discs row with 1-inch diameter heads.

2. Apply air infiltration barrier to cover upstanding flashing with 4-inch overlap.

3. Refer to Division 7 Section "Flashing and Sheet Metal" for locations where waterproofing underlayment is required, as replacement for temporary felts and/or in addition to felts specified in this Section 06100, whether or not indicated on the Drawings.

    a. Note that waterproofing underlayments / "special flashing" is to be adhered to deck and covered with air infiltration barrier / felt.

END OF SECTION 06 10 00

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SECTION 06 20 00

FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Finish carpentry items.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 08 14 16 - Flush Wood Doors

C. Section 09 90 00 - Paints and Coatings: Painting and finishing of finish carpentry items.

1.3 REFERENCE STANDARDS

A. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2004.

B. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

1.4 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data:

1. Provide instructions for attachment hardware.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.

D. Samples: Submit two samples of finish plywood, 8x8 inch in size illustrating wood grain and specified finish.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Premium grade.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire retardant requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect work from moisture damage.

1.8 PROJECT CONDITIONS

A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.

2.2 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.3 LUMBER MATERIALS

A. Softwood Lumber: SYP species, maximum moisture content of 6 percent.

B. Hardwood Lumber: white or yellow poplar species, maximum moisture content of 6 percent.

2.4 SHEET MATERIALS

A. Softwood Plywood: PS 1 Grade A-B; Veneer core; SYP face species, (or similar species permitted by reference standards).

B. Hardwood Plywood: HPVA HP-1, Grade AA, Type I at exterior, Type II at Interior; Veneer core, type of glue recommended for application; Natural Birch face species, Rotary cut.

2.5 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: NEMA LD 3, HGS; color as selected; finish as selected.

2.6 ADHESIVE

A. Adhesive: Type recommended by laminate manufacturer to suit application.

2.7 FASTENERS

A. Fasteners: Of size and type to suit application; galvanized finish in concealed locations and stainless-steel finish in exposed locations.

B. Concealed Joint Fasteners: Threaded steel.

2.8 ACCESSORIES

A. Lumber for Shimming, Blocking: Softwood lumber of SYP species.

B. Primer: Alkyd primer sealer.

C. Wood Filler: Solvent base, tinted to match surface finish color.

2.9 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Cap exposed plastic laminate finish edges with material of same finish and pattern.

C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

D. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

2.10 SHOP FINISHING

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. Prime paint surfaces in contact with cementitious materials.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

3.02 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

C. Install trim with wall adhesive by gun application.

3.03 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09 90 00.

C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION 06 20 00

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.
2. Shelf assemblies.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products, high-pressure decorative laminate, and cabinet hardware and accessories.

B. 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 items installed in architectural plastic-laminate cabinets.

C. Samples for Verification:

1. Plastic laminates, 8 by 10 inches, for each color, pattern, and surface finish.
2. Thermoset decorative panels, 8 by 10 inches, for each color, pattern, and surface finish, with edge banding on one edge.
3. Exposed cabinet hardware and accessories, one unit for each type.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For the following:

1. Composite wood products.
2. Thermoset decorative panels.
3. Adhesives.

1.4 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.

B. Installer Qualifications: Fabricator of products.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide

allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets 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 those selections and requirements in addition to the quality standard.

B. Grade: Custom.

C. Type of Construction: Frameless.

D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

1. Products: Subject to compliance with requirements, provide products indicated on Drawings in a finish materials schedule (designated "PL-Series").

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Vertical Surfaces: Grade HGS.
3. Edges: Grade HGS.

G. Materials for Semi-exposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.

a. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
b. For semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

I. Drawer Construction: Fabricate with exposed fronts fastened to sub-front with mounting screws from interior of body.

1. Join sub-fronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated by laminate manufacturer's designations.

K. Cabinet Hardware: For all applications:

Quantity	Hardware Description	Comment
2 per door	Concealed Hinges	
2 per drawer	Slides	Sized to suit drawer type
1 unit per door	Decorative pull	
1 unit per drawer	Decorative pull	
1 unit per door	Lock	Where indicated on Drawings
1 unit per drawer	Lock	Where indicated on Drawings
4 units per shelf	Shelf rest	
1 per cabinet / drawer	Cabinet lock	All millwork in each room to be keyed the same

2.2 SHELF ASSEMBLIES

A. Grade: Custom.

B. Laminate Cladding:

1. Horizontal Surfaces: Grade HGS.
2. Vertical Surfaces: Grade HGS.
3. Edges: Grade HGS.

C. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

D. Cleats: 3/4-inch solid lumber or thermoset decorative panel.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.
2. Particleboard: ANSI A208.1, Grade M-2, made with binder containing no urea formaldehyde.
3. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.4 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 170 degrees of opening, self-closing.

1. Basis-of-Design Products: Häfele Duomatic® series, or comparable products of Blum, or Grass.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

1. Decorative Pulls: Back mounted; steel with satin stainless appearing powder coat finish.

   a. Basis-of-Design Product: Häfele; 101.20.729.

D. Shelf Rests: BHMA A156.9, B04013; metal, two-pin type with shelf hold-down clip.

1. Basis-of-Design Product: Plastic body with steel pin. Knape & Vogt 338WHT.

E. Drawer Slides: BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted; full-extension type; zinc-plated steel with polymer rollers.
2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-overtravel-extension type; zinc-plated-steel ball-bearing slides.
3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 1.
4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1HD-100.
5. For drawers more than 6 inches high or more than 24 inches wide, provide Grade 1HD-200.
6. For trash bins not more than 20 inches high and 16 inches wide, provide Grade 1HD-200.

F. Door and Drawer Locks: BHMA A156.11, E07121 (doors) and E07041 (drawers)

1. Deadbolt Lock: Pin tumbler type deadbolt lock with strikes for door and drawer applications. Provide units with BHMA 626 finish.

   a. Basis-of-Design Product: National Cabinet; C8173 (for doors) and C8178 (for drawers); complete with C2003 strike plate.

   b. Provide lock for each cabinet/drawer – each room to be keyed alike. Provide grand master for entire building.

G. Door and Drawer Silencers: BHMA A156.16, L03011.

H. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
2. Satin Stainless Steel: BHMA 630.

I. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.5 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesive for Bonding Plastic Laminate: Contact cement, unpigmented contact cement, or PVA.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.6 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate cabinets to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly 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.

D. Shop-cut openings to maximum extent possible to receive hardware, appliances, 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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Use chrome plated screws and chrome plated grommets where anchorages cannot be concealed.

F. 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 sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches on center with one of the following, as applicable:

    a. No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips
    b. No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish
    c. Toggle bolts through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semi-exposed surfaces.

3.4 PLASTIC LAMINATE SCHEDULE

A. See Finish Schedule sheet A4.11 for Laminate Schedule.

END OF SECTION 06 41 16

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SECTION 07 21 00

THERMAL INSULATION

PART 1-GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes the following:

1. Concealed building insulation.
2. Building insulation in batt form.
3. Foam insulation.

1.3 DEFINITIONS:

A. Thermal Resistivity: Where the thermal resistivity of insulation products are designated by "r- values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities are expressed by the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.4 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of insulation product specified.

1.5 QUALITY ASSURANCE:

A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.

2. Fire-Resistance Ratings: ASTM E 119.

3. Combustion Characteristics: ASTM E 136.

1.6 DELIVERY, STORAGE, AND RANDLING:

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect 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 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.

PART 2-PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

1. Extruded-Polystyrene Board Insulation:
   a. Amoco Foam Products Company.
   b. DiversiFoam Products.
   c. Dow Chemical Co.

d. UC Industries, Inc.; Owens-Corning Co.
e. Or Approved Equal

2. Manufacturers of Glass-Fiber Insulation:
   a. Certain Teed Corporation.
   b. Knauf Fiber Glass GmbH.
   c. Owens-Corning Fiberglas Corporation.
   d. Manville: Building Insulations Div., Manville Sales Corp.
   e. Or Approved Equal
3. Polyurethane Foam Insulation:
   a. Owens-Corning
   b. Themaco
   c. Or Approved Equal

2.2 INSULATING MATERIALS:

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Unfaced Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
   1. Combustibility: Non-combustible, when tested in accordance with ASTM E 136.
   2. Thermal Resistance: R of 19, unless indicated otherwise.
   3. Facing: Unfaced.
   4. Manufacturers:
      a. CertainTeed Corporation: www.certainteed.com.
      b. Johns Manville Corporation: www.jm.com.
      c. Owens Corning Corp: www.owenscorning.com.
   5. Substitutions: See Section 01 60 01 - Product Requirements.

C. Faced Mineral-Fiber Blanket/Batt Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665, Type III, Class A (blankets with reflective vapor-retarder membrane facing and flame spread of 25 or less); with foil-scrim-kraft, foil - scrim, or foil-scrim-polyethylene vapor-retarder membrane on 1 face.

   1. Mineral-Fiber Type: Fibers manufactured from glass or slag.

   2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.

PART 3-EXECUTION

3.1 EXAMINATION:

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected

3.2 PREPARAION:

A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projection capable of puncturing vapor retarders.

3.3 INSTALLATION, GENERAL:

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

C. Apply single layer of insulation of required thickness indicated, unless otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION:

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. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for fire stopping.

1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

D. Set reflective, foil-faced units with not less than 0.75-inch (19-mm) air space in front of foil as indicated.

E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.5 INSTALLATION OF RADIANT BARRIERS:

A. Install radiant barriers in locations indicated according to ASTM C 1158 and radiant barrier insulation manufacturer's written instructions.

B. Set reflective, foil-faced units with not less than 0.75-inch (19-mm) air space in front of foil as indicated.

C. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

3.6 INSTALLATION OF VAPOR RETARDERS:

A. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

B. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

C. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders with adhesives or vapor retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor retarder tape. Locate all joints over framing members or other solid substrate.

3.7 PROTECTION:

A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after install.

END OF SECTION 07 21 00

SECTION 07 21 13

BOARD INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Batt insulation within exterior metal stud wall construction.

B. Rigid insulation at exterior wall cavity

1.2 RELATED REQUIREMENTS

A. Section 05 40 00 - Cold Formed Metal Framing: Supporting construction for batt insulation.

1.3 REFERENCE STANDARDS

A. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 2004.

1.4 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.5 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 – PRODUCTS

2.1 APPLICATIONS

A. Insulation within metal stud exterior walls

B. Rigid insulation within cavity of exterior wall

2.2 ACCESSORIES

A. Nails or Staples: Steel wire; electroplated, or galvanized; type and size to suit application.

B. Wire Mesh: Galvanized steel, hexagonal wire mesh.

2.3 RIGID INSULATION WALL MATERIALS

A. Provide one of the following:

1. Extruded Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation with closed cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg F (4.4 and 23.9 deg C), respectively; and as follows:

   a. Type IV, 1.6 pcf min. density, unless otherwise indicated.

   b. Product/Manufacturer: Styrofoam "Square Edge" or "Score Board", as manufactured by Dow Chemical Co., or acceptable equivalent, with joint closure/sealer accessories.

   c. Provide 1-1/2-inch thickness at any air space of exterior composite masonry walls and in air spaces of other exterior building walls, unless other thickness is indicated on the Drawings.

2. Polyisocyanurate Board Insulation: Aluminum foil faced, glass fiber reinforced, rigid, cellular, polyisocyanurate thermal insulation complying with ASTM C 1289, Type I, Class 2.

   a. Product/Manufacturer: "Thermax", as manufactured by Dow Chemical Co., or acceptable equivalent, with joint closure/sealer accessories.

   b. Provide 1-1/2-inch thickness at any air space of exterior composite masonry walls and in air spaces of other exterior building walls, unless other thickness is indicated on the Drawings.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.2 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

D. Retain insulation batts in place with wire mesh secured to framing members.

3.3 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 07 21 13

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SECTION 07 24 13

POLYMER-BASED EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related Sections: The following sections contain requirements that relate to this section:

1. Section 04 22 00 - "Concrete Unit Masonry"

2. Section 05 40 00 - "Cold-Formed Metal Framing"

3. Section 06 10 00 - "Rough Carpentry"

5. Section 07 27 00 - "Air Barrier Weather Resistant Barrier"

6. Section 07620 - "Sheet Metal Flashing and Trim"

7. Section 07 90 00 - "Joint Protection" (for requirements specified by reference in this section for sealing joints in system with elastomeric joint sealants)

8. Section 09 21 16 - "Gypsum Board Assemblies" (any gypsum sheathing)

1.2 SUMMARY:

A. This Section includes the following:

1. Applications over building wrap, over felt, and reinforced waterproof faced gypsum sheathing with sealed and facing taped joints, plywood sheathing, masonry, and/or other substrate indicated; AND REPAIRS TO EXISTING EIFS, where indicated or required.

2. Provide "water/moisture managed" Class PB Exterior Insulation and Finish Systems (E.I.F.S.), mechanically attached, at locations indicated on the Drawings - AND ABOVE 8'-0" A.F.F. OR ADJACENT WALKING SURFACE.

a. All installations are to be mechanically attached over "air infiltration barrier" (building wrap) over felt, or other similar designation, over substrate indicated.

3. Gypsum sheathing (if any), with air infiltration barrier is specified in Section 09 21 16 - "Gypsum Board Assemblies".

   a. Coordinate any sheathing work and pricing with General Contractor, so as to avoid duplication under the work of other sections.

4. Required metal trim at exposed bottom edge of system, including in part, at heads of exterior openings, shall be perforated or slotted to allow water/moisture evacuation from behind system.

5. All trim, joints, accessories, etc., shall be zinc, unless specifically indicated otherwise.

6. Any soffit vents shall be factory finished extruded aluminum with "Kynar 500" finish in color to match adjacent EIFS where occurs, or other standard color selected from manufacturer's full range.

1.3 DEFINITIONS:

A. Class PB, exterior insulation and finish systems (E.I.F.S.) refer to exterior assemblies composed of an inner layer of board insulation and an outer layer composed of a glass-fiber-mesh-reinforced base coat applied directly to board insulation and a textured protective finish coat. These assemblies are to be applied to supporting substrates of construction indicated mechanically attached over Building Wrap over "vapor barrier" (felt) over substrate indicated.

B. Designation PB for class of exterior insulation and finish systems specified in this section is based on the classification developed by the Exterior Insulation Manufacturers Association (EIMA), and as further defined by ASTM PS 49.

C. System in this section refers to Class PB exterior insulation and finish systems.

D. System manufacturer refers to the manufacturer of primary exterior insulation and finish system.

E. Thermal resistivity of the insulation board is designated by an r-value that represents the reciprocal of thermal conductivity (k-value). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivity (r-value) is expressed by the temperature difference between the two exposed faces required to cause one BTU to flow through 1 square foot per hour at mean temperatures indicated.

1.4 PERFORMANCE REQUIREMENTS:

A. Provide systems complying with the following performance requirements:

1. Bond Integrity: Free from bond failure within system 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 system and assemblies behind it or through them into interior of building that results in deterioration of thermal-insulating effectiveness or other degradation of system and assemblies behind system including substrates, supporting wall construction, and interior finish.

3. Fire Performance Characteristics: Provide materials and construction that are identical to those tested for the following fire performance characteristics, per test method indicated below, by testing and inspecting organizations acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting organization.

a. Flame Spread of Insulation Board and Finish Coats: 25 or less when tested individually per ASTM E 84.

b. Full-Scale Fire Test: Wall assembly in its final form shows no tendency to propagate flame over the surface or through finish to the core or to cause delamination of finish when vertically mounted exterior face is exposed 15 minutes to a fire source using spread of flame test per ASTM E 108 modified for testing vertical wall applications.

B. Physical Properties of Class PB System: Provide EIFS whose physical properties and structural performance comply with the following when tested per methods referenced:

1. Abrasion Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 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 and when tested per ASTM D 968, Method A.

2. Accelerated Weathering Characteristics: Sample of size suitable for test equipment and consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 2-inch- (12.7-mm-) thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 2000 hours when viewed under five times magnification per the following:

a. Either ASTM G 23, Method 1 or ASTM G 53.

C. Absorption-Freeze Resistance: No visible deleterious effects and negligible weight loss after 60 cycles per EIMA 101.01.

D. Mildew Resistance: Sample consisting of finish coat 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.

E. Salt-Spray Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 2-inch (12.7-mm-) thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 300 hours per ASTM B 117.

F. Tensile Adhesion: No failure in the adhesive, base coat, or finish coat. Minimum 5-psi (34.5-kPa) tensile strength before and after freeze-thaw and accelerated weathering tests per EIMA 101.03.

G. Water Penetration: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 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.

H. Water Resistance: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 2-inch (12.7-mm-) thick gypsum board; cured for 28 days; and showing no cracking, checking, crazing, erosion, blistering, peeling, or delamination after testing for 14 days per ASTM D 2247.

I. 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 impact classification and range:

1. Standard Impact Resistance: 25-49 inch-lb (2.8-5.6J).

J. Wind Loads: Calculate and provide for code requirements at the project site, but no less than 100 mph wind load and wind pressure no less than 20 psf acting inward or outward.

1.5 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each system and component of exterior insulation and finish systems.

C. Samples for verification purposes in the form of 2-foot-square panels for each finish, color, and texture specified. Prepare samples using same tools and techniques intended for actual work.

D. Installer certificates signed by manufacturer certifying that Installers comply with requirements under "Quality Assurance" Article.

E. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of components and systems with requirements based on comprehensive testing of current product formulations and systems.

F. Research reports or evaluation reports of the model code organization or other source acceptable to authorities having jurisdiction, that evidence system's compliance with building code in effect for Project.

1.6 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who is certified in writing by system manufacturer as qualified to install manufacturer's system, and who has completed at least five (5) verifiable equivalent projects with a verifiable record of successful in-service performance.

B. Single-Source Responsibility: Obtain materials for system from either a single manufacturer or manufacturers approved by the system manufacturer as compatible with other system components.

C. Refer to Section 01015 – "Special Conditions", for additional information and minimum experience requirements.

1.7 DELIVERY, STORAGE, AND HANDLING:

A. Deliver products in original, unopened packages and containers with manufacturer's labels identifying products legible and intact.

B. Store materials inside and under cover; keep them dry and protected from the weather, direct sunlight, surface contamination, aging, corrosion, damaging temperatures, damage from construction traffic, and other causes.

C. Stack insulation boards flat, off the ground, and protected from the sun.

D. Refer to Sections 01 11 00 "Summary of Work" and "Special Conditions" for additional information and requirements regarding stored materials.

1.8 PROJECT CONDITIONS:

A. Environmental Conditions: Do not install system when ambient outdoor temperatures are 40 deg F (4 deg C) and falling unless temporary protection and heat are provided to maintain ambient temperatures above 40 deg F (4 deg C) during installation of wet materials and for 24 hours after installation or longer to allow them to become thoroughly dry and weather resistant.

B. Protect contiguous work from moisture deterioration and soiling which might result from application of exterior insulation and finish systems. Provide temporary covering and whatever other provisions may be necessary to prevent harmful spattering of exterior finish coatings on other work.

C. Protect exterior insulation and finish system from effects of inclement weather during and until installation is completed, including flashing, joint sealers and other related work required to prevent infiltration of moisture behind system or deterioration of substrates over which system is applied.

1.9 SEQUENCING AND SCHEDULING:

A. Sequence installation of system with related work specified in other sections to ensure that wall assemblies, including flashing, trim, and joint sealers, are protected against damage from weather, aging, corrosion, and other causes.

1.10 WARRANTY:

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator jointly and severally (severable) agree to repair or replace materials that are defective, fail to maintain water repellency, delaminate or otherwise fail in performance within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

B. The above warranty shall be in addition to, shall be in effect simultaneously with, and shall not alter or limit other project or product warranties or guarantees, nor shall they serve as limitations to other remedies available to the Owner.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide "water/moisture managed" Class PB systems of one of the following:

1. Acrocrete, Inc.; Div. of BASF Wall Systems.
2. Dryvit Systems, Inc.
3. Finestone-Simplex Products Div.; BASF Wall Systems.
4. Master Wall, Inc.
5. PAREX USA, Inc.
6. Senergy Div.; BASF Wall Systems.
7. SonoWall; Div. of BASF Wall Systems.
8. STO Corp.; STO Finish Systems Div.
9. Total Wall, Inc.

2.2 MATERIALS:

A. Compatibility: Provide adhesive, board insulation, reinforcing fabrics, base and finish coat materials, mechanical anchors, sealants, and accessories that are compatible with one another and approved for use by system manufacturer.

B. Provide Colors and Textures of Protective Coating to comply with the following requirements:

1. Color: As selected by Architect from manufacturer's full line of standard colors available at Bid date.
2. Finish Texture: Smooth sand finish.

C. Molded Polystyrene Board Insulation:

1. Rigid, cellular, thermal insulation, formed by the expansion of polystyrene resin beads or granules in a closed mold. Comply with system manufacturer's requirements, ASTM C 578, Type I, and "EIMA Guideline Specification" for more stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations.

2. Approved by system manufacturer for material qualities including corner squareness and other dimensional tolerances; in manufacturer's standard lengths and widths; thickness as indicated, but not less than one-inch (1") minimum.

3. Provide 'ribbed' back units, or other profile design, as required by the system manufacturer for obtaining the moisture drainage performance capabilities.

D. Reinforcing Fabric: Balanced, alkali-resistant open weave glass fiber fabric treated for compatibility with other system materials; made from continuous multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions respectively, per ASTM D 1682 and complying with ASTM D 578, and of the following minimum weight:

1. Strip Reinforcing Fabric: Not less than 4.3 ounces per square yard.

2. "Standard" Intermediate Reinforcing Fabric: Not less than 12.0 ounces per square yard.

a. For Class PB, between 1st and 2nd coats.

E. Base Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

1. Factory-mixed formulation of Portland cement complying with ASTM C 150, Type I, white or natural color; synthetic aggregate or natural sand aggregate complying with ASTM C 897; alkaline-resistant chopped glass fibers; polymer admixture for finish coat use.

F. Polymer-Modified Portland Cement Finish Coat Materials: System manufacturer's standard mixture complying with the following requirements for material composition and method of combining materials:

1. Factory-mixed formulation of portland cement complying with ASTM C 150, Type I, natural color; hydrated lime complying with ASTM C 206, Type S; natural sand aggregate complying with ASTM C 897, alkali-resistant chopped glass fibers; and system manufacturer's standard polymer admixture.

2. Top Coat for Polymer-Modified Portland Cement Finish Coat: Where required by system manufacturer, provide factory-mixed pigmented polymer-based formulation.

G. Water: Clean and potable.

H. Adhesive for Application of Insulation (if any): System manufacturer's standard factory-mixed formulation, designed for attachment of insulation to substrates indicated.

I. Mechanical Fastener Assemblies: System manufacturer's standard corrosion-resistant fastener assemblies, consisting of thermal cap, system manufacturer's 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:

1. For attachment to wood framing members and plywood sheathing, provide steel drill screws complying with ASTM C 1002, Type W.

J. Trim Accessories: Material as indicated below and type as designated or required to suit conditions indicated and comply with system manufacturer's requirements; manufactured from zinc alloy; coordinate depth of accessories with thickness of base and finish coats required.

1. Corner Bead: Prefabricated small-nosed corner bead with expanded metal flanges extending minimum of 2-7/8 inches from corner.

a. Product: Subject to compliance with requirements, provide "Keene 1-X Corner Bead", by Penn Metal Div., Keene Corp.

b. Location for Use: On top edge of vertical (wall) installations, below flashing at roof edges. Attach securely behind insulation.

2. Casing Bead: Prefabricated one-piece type for attachment behind insulation, of depth required to suit thickness of coating and insulation.

a. Product: Subject to compliance with requirements, provide "Keene Stop Bead", by Penn Metal Div., Keene Corp.

b. Provide perforated or slotted type at bottom of EIFS installations, or other acceptable and effective method for moisture evacuation from behind system.

3. Soffit vents shall be factory finished extruded aluminum with "Kynar 500" finish in color to match adjacent EIFS where occurs, or other standard color selected from manufacturer's full range. Provide as indicated on the Drawings, equivalent to products of one of the following:

a. Extruded Moldings and Reveal Moldings, Vented and Unvented, As Indicated:

1) AMICO

2) Fry Reglet Corporation

3) Gordan, Inc.

4) M&M Systems Corporation

K. Sealant Products: Provide manufacturer's standard chemically curing, elastomeric sealant that is listed and recommended by system manufacturer for use indicated, is compatible with joint fillers, joint substrates, and other related materials and complies with requirements of Section 07 90 00 "Joint Protection" for products corresponding to description indicated below.

1. Sealant Color: Provide color of exposed sealants to match finish coat color of system.

2.2 MIXING:

A. General: Comply with system manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as approved by system manufacturer. Mix materials in clean containers. Use materials within time period specified by system manufacturer or discard.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Require Installer to examine substrates to determine if they are in satisfactory condition to receive exterior insulation and finish system. A satisfactory substrate is one that complies with requirements, including installation tolerances, of the sections in which the substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work of this section. Do not proceed with installation of system until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Protect contiguous work from moisture deterioration and soiling resulting from application of systems. Provide temporary covering and other protection needed to prevent spattering of exterior finish coatings on other work.

B. Protect system, substrates, and wall construction behind them from inclement weather during installation. Prevent infiltration of moisture behind system and deterioration of substrates.

1. Apply surface sealer over substrates where required by system manufacturer for improving any adhesive bond to obtain optimum bonding between substrate and adhesive used to attach insulation; Note however that in general, insulation board is to be mechanically attached over Building Wrap over felt over substrate indicated.

3.3 INSTALLATION:

A. General: Comply with ASTM PS 49 and system manufacturer's current published instructions for installation of system as applicable to each type of substrate indicated.

B. Mechanically attach insulation board to substrate by method complying with ASTM PS 49 and system manufacturer's current requirements. Initially install approximately 50 percent of the total number of fasteners required prior to application of reinforcing fabric. Install remainder after application of reinforcing fabric.

1. Allow for thickness of backer rod and sealant at sealant joints.

2. Space fasteners at all edges of insulation board and as indicated below:

a. Vertically: Not more than 12 inches o.c. nor more than 12 inches from bottom edge of starting course of insulation board.

b. Horizontally: Not more than 16 inches o.c.

3. Where the system manufacturer requires 'ribbed' back, or other profile insulation panels, align insulation panels for the uninterrupted flow of moisture. Apply any adhesives using toothed trowels of size and configuration indicated in the manufacturer's printed installation instructions.

C. Apply boards over dry substrates in courses with long edges oriented horizontally; begin first course from a level base line and work upwards.

1. Stagger vertical joints in successive courses to produce running bond pattern ensuring alignment of board profiles.

2. Offset joints of insulation from joints in building wrap and sheathing.

3. Interlock ends at internal and external corners.

4. Abut boards tightly at joints within and between each course to produce flush, continuously even surfaces without gaps or raised edges between insulation boards. If gaps occur, fill with insulation cut to fit gaps exactly; insert without use of adhesive.

5. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/32 inch from surface of insulation and yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch.

6. Cut insulation to fit openings, corners, and projections precisely and to produce edges and shapes conforming to details indicated.

7. Interrupt insulation where expansion joints are indicated or required by system manufacturer.

8. Coordinate flashing installation with installation of insulation to produce a wall system that does not allow water to penetrate behind building wrap.

D. Install expansion joints at locations indicated and as follows:

1. Where expansion or control joints occur in surface of construction directly behind insulation.

2. Where system abuts dissimilar materials.

3. Form joints for sealant application by leaving gaps of width needed between adjoining insulation edges as well as between insulation edges and dissimilar adjoining surfaces projecting through insulation that produce joint widths indicated after encapsulation of joint substrates with base coat, reinforcing fabric, and finish coat.

E. Install control joints at locations indicated or, if not indicated, at locations complying with the following criteria and approved by Architect:

1. Where distance between control joints exceeds 10'-0" in any direction.

2. Where panels formed by system change in size or thickness of insulation board, extend joints full width or height of protection coating.

3. Above and below door and window openings, as indicated, or omit.

F. Install trim accessories at locations indicated. Mechanically fasten accessories to framing members.

G. Treat exposed edges of insulation to comply with system manufacturer's directions.

H. Cover insulation with "standard" reinforcing fabric and attach through insulation into substrate by installing remainder of fasteners.

I. Trowel-apply base coat over and into "standard" reinforcing fabric in thickness specified by system manufacturer to produce a flush, uniform surface with fabric fully embedded and prepared to receive finish coat.

J. Apply acrylic finish coat over cured base coat in thickness specified by system manufacturer to produce a uniform finish of texture and color matching approved sample, imbedding "Standard" Intermediate Reinforcing Fabric at Class PB.

K. Apply top coats over cured finish coat, where required or recommended and in thickness specified by system manufacturer; to produce a uniform finish of texture and color matching approved sample.

3.4 INSTALLATION OF JOINT SEALANTS:

A. Prepare joints and apply sealants, of type and at locations indicated, to comply with applicable requirements of Section 07 90 00 - "Joint Protection" and with "EIMA Joint Sealant Specifications for Exterior Insulation and Finish Systems."

3.5 CLEANING AND PROTECTION:

A. Remove temporary covering and protection of other work. Promptly remove protective coatings from window and door frames and any other surfaces outside areas indicated to receive protective coating.

B. Provide final protection and maintain conditions in a manner acceptable to Installer and system manufacturer that ensures system's being without damage or deterioration at time of Substantial Completion.

1. If, despite these precautions, damage occurs, restore to a condition indistinguishable in appearance from, and equivalent in performance to, undamaged areas, by replacing or repairing in compliance with system manufacturer's recommendations.

END OF SECTION 07 24 13

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SECTION 07 27 27

SHEET-ADHERED SHEET MEMBRANE AIR BARRIER

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies the requirements for the supply and installation of the elements required for air/vapor barrier membrane installation.

B. Air/vapor barrier system: Self-adhesive tri-laminated polypropylene membrane.

1.2 RELATED WORK

A. Division 03 Concrete

B. Division 04 Masonry

C. Section 07 11 13 Bituminous Dampproofing

D. Section 07 21 13 Board Insulation

E. Division 07 Membrane Roofing System

F. Section 08 11 13 Hollow Metal Doors and Frames

G. Division 08 51 13 Aluminum Windows

H. Division 09 21 16 Gypsum Board Assemblies

1.3 TECHNICAL DOCUMENTS

A. Submit two (2) copies of the most current technical data sheets. These documents must describe the physical properties of the material, and explanations about product installation, including installation techniques, restrictions, limitations and other manufacturer recommendations.

1.4 CONTRACTOR QUALIFICATIONS

A. Vapor permeable air barrier work shall be performed only by skilled applicators, employed by an installation contractor operating all adequate

and necessary equipment to execute such work in accordance with the manufacturer's recommendations and recognized standards.

1.5 MANUFACTURER'S REPRESENTATIVE

A. The vapor permeable air barrier materials manufacturer may delegate a representative to visit the work site at commencement of work.

B. At all times, the contractor shall permit and facilitate access to the site by the manufacturer's representative cited above.

1.6 MATERIALS STORAGE

A. Handle rolls of materials with care and proper equipment.

B. Rolls of materials shall be carefully stored and adequately protected in accordance with the manufacturer's recommendations.

1.7 QUALITY ASSURANCE AND ENVIRONMENTAL MANAGEMENT

A. The manufacturer of permeable air barrier products will provided proof of ISO 9001 and ISO 14001 Certifications.

1.8 WARRANTIES

A. The product manufacturer shall issue a written and signed document in the name of the owner, certifying the product will meet all the physical characteristic published by the manufacturer, for a period of 5 years, starting from the date of completion of installation of membranes. No letter amending the manufacturer's standard warranty will be accepted and the warranty certificate must reflect these requirements.

PART 2 -PRODUCTS

2.1 VAPOR PERMEABLE AIR BARRIER MEMBRANE

1. Self-Adhered Air Barrier Membrane: [Basis of Design] Sopraseal Stick VP Membrane manufactured by Soprema; composed of a tri-layer laminated polypropylene facer. The self-adhesive underface is covered with a silicone release film; for use in wall construction as primary air barrier material.

2. Components:

   a. Surface: Tri-Laminate Polypropylene.

3. Properties:

   a. Thickness: 0.6 mm (24 mil)

   b. Tear strength @ 73.4: °F (23°C) lbf (N): (MD) = 55 (245) – (XD) = 35 (156)

   c. Ultimate elongation: (MD) = 55 – (XD) = 120 ASTM D5147

   d. Water vapor permeability ASTM E96-B (perm): 17, ASTM E96-A (perm): 11

   e. Low temperature flexibility, °F (°C): -40°F (-40°C): ASTM D5147

   f. Dimensional stability, %: (MD) = -0.5 (XD) = 0.2 ASTM D1204

   g. Plywood adhesion: 356 N/m

   h. Lap joint strength: 300 N/m

   i. Adhesion after elevated temperature exposure AAMA 711-05, level 3, 7 days @80°C (176°F): 1200 N/m

   j. Air permeability (L/sec. m²): 0.0025 per ASTM E2178

   k. Nail permeability: Pass

   l. Air leakage of air barrier assemblies ASTM E2357: Pass

   m. Fire resistant: Pass as a component of an assembly tested in conformity with NFPA 285

   n. Flame spread: Class A per ASTM E84

   o. Smoke Development: Class A per ASTM E84

2.2 PRIMER FOR SELF-ADHESIVE MEMBRANES

A. Description: A water-base polymeric primer that contain no bitumen which is used to enhance adhesion of self-adhesive membranes on most surfaces. For use when solvent based primer is not recommended.

2.3 ACCESSORIES

A. ROOF TO WALL TRANSITION MEMBRANE

1. Specified products: [Basis of Design] SOPRASEAL STICK 1100 T by SOPREMA

B. WATERPROOFING SEALANT

1. Description: A moisture cure, silylated polymer elastomeric sealant.

2. Specified product: [Basis of Design] SOPRASEAL SEALANT by SOPREMA.

C. TAPES AROUND WINDOWS

1. Specified product: [Basis of Design] SOPRASOLIN HD by SOPREMA.

D. THROUGH-WALL MEMBRANE

1. Description: Self-adhesive membrane composed of SBS modified bitumen and a strong Tri-Laminate Woven Polyethylene facer. The self-adhesive underface is covered with a silicon release sheet. Application temperatures: Available in "Summer Grade" for applications at temperatures above 10°C and in "Winter Grade" for applications at temperatures between -10°C and 10°C.

2. Specified product: SOPRASEAL WFM by SOPREMA.

PART 3- EXECUTION

B. EXAMINATION AND PREPARATION OF SURFACES

1. Surface examination and preparation must be completed in conformance with recommendations in the SOPREMA Specifications Manual.

2. Before waterproofing work begins, the owner's representative and the membrane contractor's foreman will inspect and approve substrate condition and ensure that related work has been properly executed. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be made. The start of the membrane application will mean that substrate conditions are acceptable for work completion.

3. Before commencing work, all surfaces must be smooth, dry, clean and free of ice and debris as per manufacturer's recommendations.

4. No materials will be installed during rain or snowfall.

5. Concrete must be cured a minimum of fourteen (14) days and an adhesion test is recommended before membrane application.

6. Any gap larger than 3.2 mm (1/8 inch) needs solid backing. The gap should be filled in.

7. At deflection joints, a 150 mm (6 in.) wide reinforcement strip of self-adhesive membrane centered on the joints should be installed.

C. METHOD OF EXECUTION

1. Work shall be performed on a continuous basis as surface and weather conditions allow.

2. Adjoining surfaces shall be protected against any damage that could result from the waterproofing installation.

D. EQUIPMENT

1. Maintain all equipment and tools in good working order.

E. PRIMER APPLICATION

1. Surface where primer is required (specific site conditions) shall receive polymer emulsion-based primer coating at the rate of 0.1 to 0.3 L/m². Primed surfaces must be covered the same day. If not covered the same day, primed surfaces must be re-primed.

F. VAPOR PERMEABLE AIR BARRIER MEMBRANE INSTALLATION

1. All inside corners should be covered with a 150 mm (6 in.) wide strip of membrane centered on the corner. This membrane must be installed in direct contact with the substrate not leaving any voids under the membrane strip.

2. Install the membrane on the surface by peeling back the release film on the underside and adhering the membrane to the surface.

3. Side lap joints must be a minimum of 50 mm (2 in.) and end lap joints must be a minimum of 75 mm (3 in.).

4. Holes and tears in the membrane must be repaired with vapor permeable air barrier membrane material. The repair must exceed the affected surface area by a minimum of 100 mm (4 in.). The membrane piece applied for the repair must be sealed around its edges with waterproofing sealant.

5. Use a roller recommended by the manufacturer to apply pressure over the entire surface of the membrane to ensure uniform adhesion to substrate.

6. The contractor shall inspect membrane installation meticulously at the end of each day of work and also before installation of insulation. The upper edge of the membrane must be sealed with waterproofing sealant at the end of the day's work when precipitation is anticipated or when the work is expected to be delayed or interrupted by more than one day.

7. All small protrusions (pipes, etc.) through the waterproofing membrane, should be pre-stripped with a membrane and sealed with waterproofing sealant.

8. Insulation should be installed as soon as possible following inspection of the membrane by a professional.

3.2 THROUGH-WALL FLASHING MEMBRANE INSTALLATION

A. Through-wall flashing membrane should be installed where applicable, as indicated on drawings.

3.3 MEMBRANE INSTALLATION AT OPENINGS (Windows, doors, etc.)

A. The membrane must be carefully installed around openings in the wall (windows, doors, etc.) in such a manner as to prevent any air leak at these areas (refer to drawings for details). The vapor permeable air barrier membrane must be installed to create a continuous seal at construction elements such as foundations, roofs and walls, and at junctures of different materials or construction types (curtain wall construction, etc.).

B. Self-adhesive membranes applied to junction, window frames, door frames, endings, and on the perimeter of the building, receiving a sprayed insulation, should be mechanically fastened to the substrate with a termination bar.

END OF SECTION 07 27 27

SECTION 07 41 13

METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished, prefabricated structural standing seam roof system with continuous interlocking field formed seams.

B. Related Requirements:

1. Section 05 40 00: Cold-Formed Metal Framing.
2. Section 05 50 00: Metal Fabrications.
3. Section 07 62 00: Sheet Metal Flashing and Trim
4. Section 07 90 00: Joint Protection.

1.2 REFERENCES

A. Reference Standards:

1. ASCE 7: Minimum Design Loads for Buildings and Other Structures.
2. ASTM A653: Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
3. ASTM A792: Steel Sheet, 55 % Aluminum Zinc Alloy Coated by the Hot Dip Process.
4. ASTM C1371: Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549: Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D523: Specular Gloss.
7. ASTM E1680: Rate of Air Leakage Through Exterior Metal Roof Panel Systems

8. ASTM E1592: Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

9. ASTM E1646: Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.

10. ASTM E1918: Measuring Solar Reflectance of Horizontal and Low Sloped Surfaces in the Field.

11. ASTM E1980: Calculating Solar Reflectance Index of Horizontal and Low Sloped Opaque Surfaces.

12. ASTM E2140: Weather Penetration of Metal Roof Panel Systems by Static Water Pressure Head.

13. CRRC-1 Method #1: Measuring Solar Reflectance of a Flat, Opaque, and Heterogeneous Surface Using a Portable Solar Reflectometer.

14. FM Approvals Standard 4471: Class 1 Panel Roofs.

15. SMACNA Architectural Sheet Metal Manual.

16. UL 580: Standard for Tests for Uplift Resistance of Roof Assemblies

17. US Environmental Protection Agency: Energy Star Reflective Roof Products

1.3 SUBMITTALS

A. Product Data.

B. Shop Drawings:

1. Indicate thickness and dimensions of parts, fastenings and anchoring methods, details and locations of joints, transitions and other provisions necessary for thermal expansion and contraction.

2. Indicate locations of field- and factory-applied sealant.

C. Samples:

1. Submit two samples, 12 inches long by full panel width, showing proposed metal thickness and seam profile.

2. Submit standard color samples of metal for Architect's selection.

D. Manufacturer Qualifications.

E. Installer Qualifications: Submit list of completed projects, with names and contact information for architects and contractors.

F. Test Reports: Indicating compliance of products with project requirements.

G. Warranty Documentation.

H. Insurance Documentation.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Ten years' experience, minimum, in factory fabrication of metal panels.

2. Manufacturer shall carry $2,000,000 liability insurance, minimum, for metal panel system.

B. Installer Qualifications:

1. Three years' experience, minimum, in application of metal roof or wall panels.

2. Five satisfactory projects with metal panel work of similar scope and complexity to Work of this Project.

3. Installer must be approved by manufacturer in writing prior to bid. Approval document must be included with project bid.

C. Testing Agency Qualifications: Agency compliant with ISO/IEC Standard 17025, or an accredited independent agency recognized by the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement or ANSI.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:

1. Keep panels and accessory items dry.

2. Protect against damage and discoloration.

3. Handle panels with non-marring slings.

4. Support panels to prevent permanent deformation.

5. Store panels above ground, with one end elevated for drainage.

6. Protect panels against standing water and condensation between adjacent surfaces.

7. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and keep sheets separate for air-drying.

8. Painted panels shall be shipped with protective plastic sheeting or a strippable film coating between panels. Remove strippable film coating prior to installation. Do not allow strippable film coating to remain on panels in extreme heat, cold, or direct sunlight or other UV source.

9. Do not allow panels to contact treated lumber.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard 25-year performance warranty, stating the following:

1. Architectural fluorocarbon finish:

a. Will be free of fading or color change in excess of 5 Hunter delta-E units as determined by ASTM D2244-02.

b. Will not chalk in excess of numerical rating of 8 when measured in accordance with standard procedures specified in ASTM D4214-98 method D659.

c. Will not peel, crack, chip, or delaminate.

2. Metal substrate will not rupture, fail structurally, or perforate.

B. Installer's Warranty: Warrant panels, flashings, sealants, fasteners and accessories against defective materials and/or workmanship, covering repairs required to maintain roof panels watertight and weatherproof with normal usage for two years following Project Substantial Completion date.

1. Furnish written warranty, signed by installer.

C. Weathertight Performance Warranty: Manufacturer's standard warranty in which manufacturer agrees to repair or replace metal roof panel assemblies that fail to remain weather tight within specified warranty period.

1. Contact AEP Span for Weathertight Warranty information and requirements.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Products: Provide the following:

1. Basis of Design: AEP Span, a Division of ASC Profiles, Inc.; SpanSeam.

2. Approved equal

B. Substitution Limitations: Substitutions will be considered in accordance with Section 01 33 00 "Submittal Procedures".

C. Performance Criteria

1. Wind Uplift: Class 90 per UL 580.

a. Panel system shall be ASTM E1592 tested under the supervision of an ANSI or ISO/IEC accredited laboratory and the laboratory shall issue the test report.

b. Deflection Limits: Withstand wind loads with deflections no greater than 1/180 of the span.

2. Air Infiltration: Tested in accordance with ASTM E1680.

a. 0.002 cfm per linear foot of joint at static test pressure differential of 12.00 psf.

3. Water Infiltration Under Static Pressure: Tested with sidelap sealant per ASTM E1646.

a. No leakage through panel joints at 20.00 psf.

4. Water Penetration: No leakage through panel side seams and endlaps after six hours when tested according to ASTM E2140 at a static water pressure head of 6.00 inches.

5. Thermal Movements: Accommodate thermal movement without buckling, joint opening, overstressing components, failure of connections, or other detrimental effects, through the following temperature changes:

a. 120 degrees F, ambient.

b. 180 degrees F, material surface.

D. Sustainability Characteristics:

1. Energy Performance:

   a. Provide Energy Star qualified product for slope indicated in Drawings.

   b. Solar reflective index (SRI): Not less than 29 per ASTM E1980.

   c. Reflectance and Emissivity:

      1) Solar Reflectance: Not less than 0.25 per ASTM test methods C1549 or E1918, or CRRC-1 Method #1.

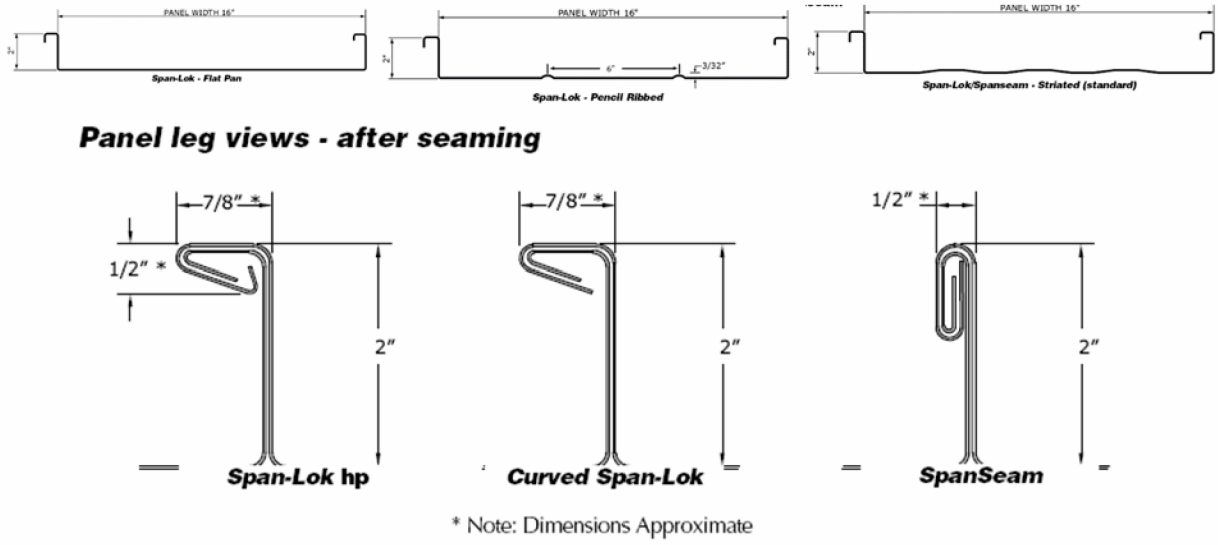
      2) Thermal Emissivity: Not less than 0.75 per ASTM C1371.

E. Manufacturing Characteristics: Provide panels complying with provisions of Buy American Act 41 U.S. C 10a - 10d.

2.2 PANELS

A. Panels: AEP Span, a Division of ASC Profiles, Inc.; Preformed Metal Standing Seam Roofing –SpanSeam (SPS2216), and.

   1. Material: Steel conforming to ASTM A792.



   a. 22 Gauge: Yield strength 50,000 psi; with aluminum-zinc alloy coating conforming to ASTM A792, Class AZ50.

   2. Panel Width and Pattern:

      a. 16-inch panel width, with striated pattern.

   3. Panel Seam Height: 2 inches.

* *Dimensions are approximate.

4. Panel Finish: Provide primer and top finish coat on exposed faces; provide primer and backer coat on concealed faces of panels.

   a. DuraTech® 5000: Polyvinylidine Fluoride, full 70 percent Kynar 500®or Hylar 5000®, consisting of a baked-on 0.15-0.20 mil corrosion resistant primer and a baked-on 0.70-0.80 mil finish coat with a specular gloss of 8 to 15 when tested in accordance with ASTM D523 at 60 degrees.

   b. Panel Color: As selected from manufacturer's full range.

5. Seam Sealant: Factory apply high-grade butyl mastic sealant within the confines of panel's female leg, designed to seal against adjacent male panel leg.

2.3 FRAMING AND SUBSTRATES

A. Secondary Framing: See Section 05 40 00 "Cold-Formed Metal Framing".

B. Sheathing: As specified.

C. Waterproofing Underlayment: Self-Adhering Sheet Underlayment: Metal Roof or Horizontal Applications of Metal (Occurring Over Solid Substrates): Self-Adhering, Rubberized Asphalt bonded to Polyethylene-Film, 30 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to butyl rubber adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Thermal stability: Stable after testing at 240 deg. F., and unaffected at -20 deg. F.; ASTM D 1970.

   1. "CCW WIP 300HT", Carlisle Coatings & Waterproofing, Inc.: www.carlisle-ccw.com.

   2. "Ultra" [Basis of Design], W.R. Grace & Co. - Conn., Atlanta, GA:http://www.na.graceconstruction.com/underlayments/download/UL-005Q.pdf.

   3. "WinterGuard HT", CertainTeed Corporation: www.certainteed.com.

D. Install 1-layer over substrate surface at the following locations:

   1. Below all metal roofing, and behind any metal wall panels and metal siding.

   2. Where roofing planes intersect vertical walls and planes, turn up edges at least 8-inches.

2.4 CLIPS AND FASTENERS

A. Clips: Provide clip designed to allow panels to thermally expand and contract. Clip shall incorporate a self-centering feature to allow 1 inch of movement in both directions along panel length. Clip type shall be selected to meet positive and negative pressures as specified.

1. Sealant: Factory-installed sealant to provide continuity of seal at clip locations.

B. Plate: Required where rigid insulation is designated, Designed with tabs to attached clip base to bearing plate on the ground, prior to installation.

C. Fasteners: Manufacturer's standard #12 - 14 by 1 1/4 inch long self-drilling, hex head drive screws for metal; noncorrosive base material.

2.5 INSULATION

A. Rigid Insulation: Where indicated on the drawings.

1. Thermal Spacer Blocks: As recommended by roofing manufacturer.

B. Fiberglass Insulation: See Section 07 21 13 "Board Insulation".

2.6 ACCESSORIES

A. Trims and Flashings: Material, metal thickness, and finish to match panels. Profiles indicated in Drawings.

1. Provide manufacturer's standard accessories and other items essential to completeness of standing seam roof installation.

B. Panel Penetration Flashings: As recommended by panel manufacturer; designed to provide sufficient movement to prevent creation of points of fixity at penetrations.

C. Sealant for Field Application: high grade non-curing butyl or curing urethane sealant as recommended by panel manufacturer. Do not use sealant containing asphalt.

2.7 FABRICATION

A. Fabrication, General:

1. Unless otherwise shown on Drawings or specified herein, fabricate panels in continuous lengths and fabricate flashings and accessories in longest

practical lengths. Contact AEP Span if panel lengths required 77 feet or longer.

2. Panels shall be factory correctively-leveled.

B. Panels:

1. Provide panels in full length from ridge to eave when possible.

2. Where single length panels are not practical, provide mated swaged panels for positive joint end laps, shingled to accommodate water run-off (fabricated with overlap in direction of water flow).

3. Roof panels shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations which create voids and requiring supplemental closure devices shall not be considered acceptable.

4. Engineer panels to use concealed anchors that permit expansion and contraction, except at eaves, end laps, ridges, valleys, hips and gables.

C. Seams:

1. Panel seams shall interlock entire length of seam.

2. Design standing seam to lock up and resist joint disengagement during design wind uplift conditions as calculated according to local building codes.

3. Provide pre-installed sealant within confines of panel's female leg to aid in resistance of leaks and provide panel-to-panel seal while allowing expansion and contraction movement.

4. Seams shall be continuously locked or crimped together by mechanical means during installation. Seaming tools shall be sourced from manufacturer's recommended vendor.

D. Fabrication Tolerances:

1. Flat metal surfaces will display waviness commonly referred to as "oil canning". This is caused by steel mill tolerances and is a characteristic, not a defect, of panels manufactured from light gauge metal. Panels are factory correctively-leveled to minimize the occurrence of "oil canning". As such, "oil canning" will not be accepted as cause for rejection.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: With Installer present.

1. Examine conditions and substrates on which metal panels are to be installed. Structural support or substrate shall be flat and plumb to avoid panel stresses and distortion.

2. Prior to starting work, correct defects.

B. Field Measurements:

1. Coordinate field measurements and fabrication schedule with construction progress.

2. Field measure prior to fabrication. Show recorded dimensions on shop drawings, including locations of shop-fabricated openings.

3. If field measurements differ from drawing dimensions, notify Architect prior to fabrication.

C. Substrate Tolerances: Deviations from flat plane shall not exceed the following.

1. 1/4 inch in 20 feet.

2. 1/2 inch across building elevation.

3. 1/8 inch in 5 feet.

3.2 PREPARATION

A. Substrate and Underlayment: Install according to approved shop drawings and metal panel manufacturer's recommendations.

3.3 INSTALLATION

A. Panels and Trim: Comply with manufacturer's instructions for assembly, installation and erection for weather tight installation.

1. Install according to approved shop drawings.

2. Install panels in accordance with manufacturer’s instructions and recommendations. Anchor securely in place using clips and fasteners

spaced in accordance with manufacturer's recommendations for design wind load criteria.

3. Form seams with manufacturer-approved motorized seaming tool; completely engage panel, clip, and factory-applied sealant in seam.

4. Comply with methods and recommendations of SMACNA Architectural Sheet Metal Manual for flashing configurations required.

5. Discrepancies between job site conditions and shop drawings shall be brought to the attention of the Architect for resolution.

6. Cutting and Fitting:

   a. Cut panels neat, square, and true with shearing action cutters. Torch or power saw cutting is prohibited.

   b. Openings 6 inches and larger: Shop fabricate and reinforce to maintain original load capacity.

   c. Openings less than 6 inches: Field cutting is acceptable.

7. Dissimilar Metals or Materials:

   a. Where panel or trim may come in contact with dissimilar metals or treated lumber, fabricate transition to facilitate drainage and minimize possibility of galvanic action. Galvanic action can cause panels and trim to fail prematurely.

   b. At points of contact with dissimilar metal or treated lumber, coat panel and trim with protective paint or separate materials with a weatherproof underlayment.

   c. Direct contact or run-off from CCA, ACQ, CA, or other treated lumber (outdoor wood) or fire retardant impregnated or treated wood shakes or siding can cause panels and trim to fail prematurely. Avoid contact with these materials.

B. Accessories: Install trims, flashings, and roofing specialties according to Drawings and manufacturer's recommended details.

C. Sealant Installation: Apply according to approved shop drawings and SMACNA Architectural Sheet Metal Manual recommendations.

   1. Provide airtight and waterproof installation.

D. Installation Tolerances: Match dimensional tolerances of framing or substrate.

3.4 CLEANING

A. Repairs:

1. Touch up paint is not required for panels with scratches that do not expose metal.

2. Panels or flashings with finish damage exposing metal or with substrate damage shall be replaced.

B. Cleaning and Waste Management:

1. At completion of each day's work and at work completion, sweep panels, flashings, and gutters clean. Do not allow fasteners, cuttings, filings, or scraps to accumulate.

2. Clean exposed surfaces of work promptly after completion of installation.

3.5 PROTECTION

A. Protect Work as required to ensure that roofing will be without damage at Final Completion.

END OF SECTION 07 41 13

SECTION 07 42 93

ALUMINUM SOFFIT AND FASCIA SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes the following:

1. Miscellaneous aluminum fascia, trim, and accessories, other than metalwork contiguous with and/or associated with roofing systems, gravel guards, and that related work.

2. Aluminum soffit systems, with hold-down clips, trim and accessories.

3. Color and texture as selected by Architect from manufacturers standard color selections.

B. Related Sections include the following:

1. Section 07 62 00 "Sheet Metal Flashing and Trim" for elastic and metal flashing.

2. Section 07 90 00 "Joint Protection" for field-applied sealants.

3. Section 09 90 00 "Paintings and Coatings" for painting of framing and decking above perforated soffits.

1.3 SUBMITTALS:

A. Product Data: For each type of product specified. Include identification of materials; dimensions of individual components; installation instructions; and available profiles, textures, and colors.

B. Samples for Initial Selection: Manufacturer's sample finishes showing the full range of colors, profiles, and textures available.

C. Samples for Verification: Full-size units of each type of wall panel, fascia, soffit, and trim indicated; in sets for each color, texture, and pattern specified.

1. 12-inch-long-by-actual-width sample of fascia.

2. 12-inch-long-by-actual-width sample of soffit.

3. 12-inch-long-by-actual-width sample of trim.

D. Research/Evaluation Reports: Evidence of wall panel, soffit and fascia systems' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced installer who has completed soffit and fascia installations similar in material, design, and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance.

1. Refer to Division 1 Section "Special Conditions" for additional information and minimum experience requirements.

B. Source Limitations for System and Accessories: Obtain each color, texture, pattern, and type of wall panel, soffit, fascia, and related accessories from one source, with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to Project site in manufacturer's unopened packages or bundles with labels intact.

B. Store materials in a dry, well-ventilated, weather tight place. Do not store even temporarily on the ground. Comply with manufacturer's written instructions for storage, handling, and protection.

1. Refer to Sections 01 11 00 "Summary of Work" and "Special Conditions", for additional information and requirements regarding stored materials.

1.6 PROJECT CONDITIONS:

A. Weather Limitations: Proceed with wall panel, soffit and fascia system installation only if existing and forecasted weather conditions permit the systems to be installed according to manufacturer's current written instructions and if substrate is completely dry.

1.7 WARRANTY:

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Project Warranty: Submit a written warranty, executed by wall panel, soffit and fascia system manufacturer, agreeing to repair or replace soffit, fascia and siding systems that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering. Fading is defined as loss of color, after cleaning with product recommended by manufacturer, of more than 4 color-difference units as measured according to ASTM D 2244.

1. Warranty Period: 20 years from date of Substantial Completion.

1.8 EXTRA MATERIALS:

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish full lengths of soffit and fascia system and each type of trim in a quantity equal to at least 2 percent of amount installed, in whole and unopened packages.

PART 2 – PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Aluminum Soffit and Fascia Systems:

a. Alcoa Building Products.

b. Alside, Inc.

c. Gentek Building Products.

d. Peterson Aluminum: www.pac-clad.com

e. Reynolds Metals Co.

f. Sentriclad Architectural Metals.

2.2 SOFFIT:

A. Formed Aluminum Soffit: Aluminum soffit complying with AAMA 1402 shall meet the requirements of this section, fabricated from aluminum sheet in alloy recommended in writing by soffit and fascia system manufacturer, and as follows:

1. Pattern: 12-inch exposure (unless otherwise noted) in pattern indicated.

2. Ventilation: Provide perforated and non-perforated soffit as indicated.

3. Thickness: 19 gauge nominal (minimum .032") aluminum.

4. Finish: Fluoropolymer (Kynar) finish: AAMA 2605, three coat.

   a. Color: As selected by Architect from manufacturer's full range of colors.

5. Provide manufacturer's standard metal channel supports, trim, accessories, and hold-down clips at 24-inches o.c. maximum, and as otherwise required to prevent wind blow-out of soffit material.

2.3 FASCIA:

A. Formed Aluminum Fascia: Aluminum fascia complying with AAMA 1402 shall meet the requirements of this section, fabricated from aluminum sheet in alloy recommended by soffit and fascia system manufacturer, and as follows:

1. Pattern and Configuration: As indicated.

2. Finish: Fluoropolyer (Kynar) finish: AAMA 2605, three coat.

   a. Color: As selected by Architect from manufacturer's full range of colors.

3. Provide manufacturer's standard metal channel supports, trim, accessories, fasteners, and hold-down clips as required or recommended by manufacturer to prevent wind blow-off.

2.4 ACCESSORIES:

A. Siding Trim and Accessories: Provide starter strips, edge trim, window head flashing, corner cap, hold-down clips, and other items as recommended by manufacturer for building configuration; match type of siding.

B. Decorative Accessories: Provide the following types of decorative accessories as indicated:

1. Corner trim.

2. Door and window casings (if any indicated).

3. Fascia.

4. Moldings and trim.

C. Fasteners: Noncorrosive aluminum siding nails, in sufficient length to penetrate a minimum of 1 inch (25 mm) into substrate. Provide prefinished fasteners in color to match soffit, fascia and siding finishes where face nailing is unavoidable.

2.5 COLORS AND TEXTURES:

A. Where manufacturer's standard products are indicated, provide soffit systems, fascia and accessories complying with the following requirements:

1. Provide Architect's selections from manufacturer's full range of colors and textures for soffit, fascia and any siding and accessories, of type indicated. Accessories may be required to match soffits or to be of a different color or texture to match metal roofing or as otherwise selected by Architect.

2. Fascia, Soffit, Trim and Related Work: Two colors may be required, unless specifically indicated otherwise.

3. Finishes: As selected by Architect from manufacturer's standard non-metallic finishes, and as otherwise indicated.

PART 3 – EXECUTION

3.1 EXAMINATION:

A. Examine substrates for compliance with requirements for substrates, flashings, vapor/moisture barrier completion, water-tightness, installation tolerances,

completed painting of framing and decking above perforated soffits, and other conditions affecting performance of soffit systems and accessories.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Clean substrates of projections and substances detrimental to application.

B. Coordinate installation with flashings and other adjoining construction to ensure proper sequencing.

3.3 INSTALLATION:

A. General: Comply with soffit and fascia system manufacturer's current written installation instructions applicable to products and applications indicated, unless more stringent requirements apply. Center nails in elongated nailing slots without binding soffits, trim and siding to allow for thermal movement. Overlap joints to shed water away from direction of prevailing wind.

B. Install aluminum fascia, soffit, and accessories according to AAMA 1402.

C. Where perforations in soffit material allow viewing through perforations, install with that side of perforations toward building wall.

D. Isolate dissimilar metals by separating from soffit, fascia and aluminum siding with rubber gaskets, elastomeric sealant, or rubber washers where fasteners penetrate soffits, fascia and siding. Dissimilar metals behind soffit and fascia systems may be isolated by covering with polyethylene film, except where use of plastic film would restrict air flow of ventilated soffit systems.

3.4 ADJUSTING AND CLEANING:

A. Remove and replace damaged, improperly installed, or otherwise defective soffit and fascia materials with new materials complying with specified requirements.

B. Clean finished surfaces according to soffit and fascia manufacturer's written instructions and maintain in a clean condition during construction.

END OF SECTION 07 42 93

07 46 19

STEEL SOFFITS AND SIDING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wood Grain Steel siding and accessories.

1.2 RELATED SECTIONS

A. Section 05 40 00 - Cold-Formed Metal Framing.

B. Section 06 10 00 - Rough Carpentry.

C. Section 07 27 00 - Air Barriers.

D. Section 07 60 00 - Flashing and Sheet Metal.

E. Section 07 90 00 - Joint Protection.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. International Residential Code (IRC):
1. IRC 2018: R703.3 - Exterior Covering: Wall covering nominal thickness and attachments.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data:
1. Manufacturer's data sheets on each product to be used.
2. Siding materials, underlayment, flashings, fasteners, and accessories.
3. Dimensions, physical properties, and typical details.
4. Preparation instructions and recommendations.
5. Storage and handling requirements and recommendations.
6. Typical installation methods.

C. Shop Drawings:
1. Show layout, methods of attachment, provisions for movement, flashing, trim, edge and field conditions, interface with adjacent materials, locations of cutouts or special shapes, existing construction, and details.

2. Submit overall layout of panels with small scale details, and large scale details of edge conditions, joints, fastener and sealant placement, flashings, penetrations, and special conditions.
3. Distinguish between factory and field assembled work.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns and including the following:
1. Siding: One of each type, full panel width by 12 inches (300 mm) long.
2. Fasteners and Accessories: Two of each type, full size, indicating use.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

F. Installer qualifications.

G. Closeout submittals:
1. Maintenance and cleaning instructions.
2. Warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
3. Retain mock-up during construction as a standard for comparison with completed work.
4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled

commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
   1. Organize package contents to minimize sorting on site.
   2. Verify quantities and condition immediately upon receipt. Remove damaged products from the site, coordinate with the manufacturer to replace with new materials to meet specified requirements.

B. Steel siding wall panels are identified by a label affixed on product packaging. The label is to include the company name, Quality Edge, Inc., and product name or code.

C. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Field Measurement: Verify field conditions prior to shop drawings or fabrications.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Manufacturer's limited warranty unless indicated otherwise.

B. Warranty applies only to building products installed in the fifty (50) United States and the District of Columbia.

C. Lifetime Limited Warranty includes protection against peeling, flaking, chipping, cracking, color fade, chalking, rust, hail, and abrasion. Vesta's steel core is unlike any other and designed to defend against whatever nature throws at it. An anti-corrosive zinc barrier provides unyielding protection born to last generations.
   1. Duration for Commercial Vesta Siding: 50 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Quality Edge, which is located at: 2712 Walkent Dr.; Walker, MI 49544; Toll Free Tel: 888-784-0878; Tel: 616-735-3833; Fax: 616-735-3844; Email:request info (kostreko@qualityedge.com); Web:https://www.qualityedge.com/

B. or other approved manufacturer.

2.2 PERFORMANCE AND DESIGN REQUIREMENTS

A. Certifications and Ratings:
   1. Building Code Ratings: Source: IRC 2018: R703.3 Wall Covering Nominal Thickness and attachments.
   2. Material, Paint and Coatings:
      a. Recyclable: 100 percent.
      b. Recycled Content: 33 to 89 percent.
      c. Coatings: VOC-free. Lead free.
   3. Non-Combustible Fire Ratings:
      a. ASTM E84 and ASTM E84-18b: Class A.
         1) Flame Spread Index: 25.
         2) Smoke Development Index: 450.
   4. Structural Performance Rating: ASTM E1592-05.

B. Physical Characteristics:
   1. Tensile Strength: Complies with ASTM A653
   2. Yield Strength: 33,000 to 55,000 psi (227.52 to 379.21 Mpa).
   3. Profile: Supports vertical, horizontal or porch ceiling installation.
   4. Elongation: Greater than 20 percent
   5. Humidity Cabinet: Panels given 90 degree bend and subjected to 100 percent Relative Humidity at 95 to 105 degrees F (35 to 40.5 degrees C) for 1,000 hours; no blistering, cracking, loss of gloss or peeling and no softening after 24 hour recovery.
   6. Film Adhesion:
      a. No blistering or loss of adhesion after immersion in distilled boiling water for a minimum of 4 hours followed by a minimum 4 hour freeze test.
      b. Finish shall not be removed from cross hatched lines scored 1/8 inch (3 mm) apart after application of number 600 Scotch tape.
   7. Reverse Impact: Garner impact tester; 5/8 inch (16 mm) steel ball, 120 inch-lbs (13.6 n-m).
   8. Bending: 1-2T 180 degree bend, 0.020 inch (0.51 mm) thick steel.
   9. Salt Spray: When subject to a 5 percent salt solution per ASTM B117, shall withstand 1,000 hours exposure without blistering or loss of adhesion. Quality Edge warrants installations further than 1,500 feet (457.2 m) from the ocean.
   10. Weatherometer: Tested in accordance with ASTM D822-57T after period of 2,000 actual light hours with humidity control shall show no cracking, crazing, or loss of adhesion.
      a. Chalking: No greater than ASTM D659.44 No. 10 rating, based on

a scale of 10 being excellent.
b. Color Change: No more than 8 Hunter E units.

2.3 STEEL SIDING AND ACCESSORIES

A. Basis of Design: Vesta Steel Siding as manufactured by Quality Edge. Quality Edge Vesta are steel siding wall panels used on interior and exterior walls, and ceiling, as cladding.
1. Application: Horizontal, soffit and interior exposed gable ceiling.
2. Profile: To have built-in breathing ducts that promote air circulation between joint seams and behind the building surface.
a. Woodgrain Face: 5 inches (127 mm). Plank Length: 8 ft (2.438 m).
b. Smooth Solid Face (Siding application only): 5 inches (127 mm). Plank Length: 12 ft (3.658 m).
3. Material: G60 Galvanized Commercial Steel ASTM A653 CS Type B, coating designation
a. Panel Thickness: 0.020 inches (0.51 mm).
b. Accessories Thickness: 0.016 inches (0.406 mm).
4. Finish: Wood grain. Panels to have 6 unique grain configurations to more resemble real wood. Kynar 500; 70 percent PVDF, and CarbonTech90.
a. Color: 482 Gilded Grain
5. Finish: Solid. Kynar; 50 percent PVDF, and CarbonTech90.
a. Color: 463 Coal.

B. Accessories:
1. Starter trim.
2. Outside corner post.
3. Large outside corner post.
4. Inside corner post.
5. H-channel.
6. J-Channel.
7. Drip Cap
8. Trim coil. 14.77 inches (375 mm) wide x 30 ft (9.144 m) long.
9. Support trim.
10. Utility trim.
11. Brick ledge flashing.
12. L-Flashing.
13. Touch-up paint.
14. Nails: 1.5 inch (38 mm).
15. Screws: 1.5 inch (38 mm).
16. Fascia: 6 inch (152 mm) with mounting brackets.
17. Fascia: 8 inches (203 mm) with mounting brackets.
18. Vented plank soffit.

2.4 SIDING AND TRIM ACCESSORIES

A. Provide coordinating trim, accessories, and flashing as required for a complete installation. All components to be provided by same manufacturer

as siding.

B. Colors to be selected by Architect

C. Provide starter and closure pieces as required.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates with installer present. Inspect for tolerances and conditions that could adversely affect installation.

B. Do not begin installation until substrates have been properly constructed and prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and shop drawings, which must be always available on the Project site for inspection.
   1. Attach siding in place using manufacturers recommended fasteners, sealants, and adhesives as indicated on shop drawings.
   2. Cut siding as recommended by manufacturer.
   3. Prevent galvanic action by treating faces and edges in contact with dissimilar metals as recommended by the manufacturer.
   4. Install siding with positive anchoring to the building and provide for thermal expansion.
   5. Provide expansion space as recommended by manufacturer.
   6. Coordinate installation with flashings and other components.
   7. Provide concealed fasteners except where approved on shop drawings.
   8. Set units true to line and levels indicated on the drawings.

B. When cutting steel siding a ferrous cutting blade must be used. A carbide tip saw blade with the max number of teeth per the diameter of the blade.

C. Planks must be installed on a minimum 1/2 inch (13 mm) OSB or plywood solid flat wall over house wrap. Fasten all panels loose (floating) to wall using 1-1/2 inch (38 mm) nails or screws, inserting fasteners into the holes along the top of the panel 16 inch (406 mm) on center. Ensure each panel is fully

engaged to the one below via the pre-rolled feature at the bottom of the panel before fastening it.

D. The wood printed panels have 6 distinct wood grains. Printed on the top nailing flange are numbers 1 to 6, these numbers identify the different paints. When installing the panels look at the number and mix them on the wall. The panels are mixed in the box 1 thru 6 from the factory, for the best look install different numbers by the previous panels. Complete installation instructions can be found at: www.qualityedge.com/resources.

3.4 FIELD QUALITY CONTROL

A. Inspect units as they are installed. Do not install cracked, broken, twisted, or damaged units.

B. Do not scratch or mar installed units. Units damaged during installation shall be immediately removed and replaces, remove damaged units from the project site.

C. Metal building materials should always be stored in a dry, well-ventilated place. Never cover materials with a non-breathing or plastic tarp. This causes condensation to form, which deteriorates the protective coating of the material.

D. Inspect complete installation to ensure that it is weather tight in accordance with the manufacturer's instructions.

3.5 CLEANING

A. Remove excess materials and debris from the project site.

3.6 PROTECTION

A. Protect installed products until completion of project.

B. Steel siding and trim must never come in contact with other metals like aluminum. Flashing tape can be used as a spacer to separate the metals.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 07 54 19

POLYVINYL-CHLORIDE ROOFING

PART 1 - GENERAL CONDITIONS

1.1 GENERAL

A. Drawings and general provisions of the Contract, including General and Supplemental Conditions and Division 1 Specification sections, apply to and from this section.

B. Related Work:

1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplemental Conditions, and Sections in Division 1 of these Specifications.

1.2 DESCRIPTION

A. Scope

Install a complete mechanically-attached single-ply PVC roofing system including membrane, flashings and other components in accordance with roofing manufacturer's specifications.

1. Remove all existing material to the top of the roof deck. Remove all existing material from curb and penetrations including all termination bars.

2. Install new 2-1/2" rigid polyisocyanurate foam insulation over entire roof. Use tapered insulation to achieve designated roof drainage.

3. Contractor shall furnish and install a white 60 mil single ply membrane roofing system that is fabricated of a polyester fabric and has a thermoplastic coating of thermoplastic material laminated to both sides as manufactured by system supplier.

4. Adjust (reposition) all parapet stones as required.

a. Reuse coping if possible and/or match with new fascia bar and cover per Manufacturer's specifications

b. On details were coping cannot be removed, reference Manufacturer's recommended details

c. Any new fascia bar and/or coping must have a Kynar finish and color must be approved by the City Architect.

d. All curbs, deck sheets and parapets shall be installed as wrinkle free as possible.

5. Necessary steps shall be taken to remove ponding areas by adding additional underlayment in low lying areas and/or lowering any necessary drains and/or scuppers to insure proper drainage on the roof deck. When applicable, clean out and remove any debris to insure drains, scuppers, gutters and downspouts are free flowing.

6. Install new flashings on all roof penetrations as specified by roof membrane manufacturer.

7. Furnish and install walkway pads at all serviceable rooftop units. These walkway pads must completely surround all serviceable roof top units.

8. Install new 4x4 pressure treated wood used for sleepers at exposed conduit runs, gas pipes, AC units, and other such items.

9. Contractor must install the roofing system and dispose of all debris in accordance with all local, state, and federal regulations.

10. The successful Contractor shall be required to conduct a preconstruction meeting with the City Architect prior to delivery of any tools or product on site.

B. Related Work

In addition to the above scope, the work includes but is not limited to the installation of:

1. Removal of Existing Roofing Ballast and Damaged Insulation

2. Substrate Preparation

3. Wood Blocking

4. Insulation

5. Separation Layers

6. Roof Membrane

7. Fasteners

8. Adhesive for Flashings

9. Roof Membrane Flashings

10. Walkways

11. Metal Flashings

12. Sealants

1.3 QUALITY ASSURANCE/ ROOFING CONTRACTOR'S QUALIFICATIONS

A. The roofing system shall be applied only by a Contractor authorized by the Manufacturer prior to bid.

B. Upon completion of the installation and the delivery to the Manufacturer by the Contractor of a certification that all work has been done in strict accordance with the contract specifications and Manufacturer's requirements, an inspection shall be made by a Technical Representative of the Manufacturer to review the installed roof system. Any deficiencies shall be corrected by the Contractor and made ready for re-inspection within (5) working days. Upon acceptance, the warranty shall be promptly issued.

C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner and Manufacturer.

D. Contractor shall submit work history data showing having had successful warranted installation experience of the system specified, and of being a current Master Contractor (or equivalent) authorized by the roofing system manufacturer to install the specified manufacturer's materials. An authorized letter shall be submitted by the roof membrane's manufacturer stating the Contractor meets these qualifications and are in good standings with the membrane manufacturer.

1.4 SUBMITTALS

Comply with pertinent provisions of Section 01 33 00. Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, the Contractor shall submit to the Owner following:

A. Copies of Specification.

B. Samples of each primary component to be used in the roof system and the Manufacturer's current literature for each component.

C. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.

D. Sample copy of Manufacturer's warranty.

E. Dimensioned shop drawings which shall include:

1. Outline of roof with roof size and elevations shown.

2. Profile details of flashing methods for penetrations.

3. Technical acceptance from Manufacturer.

F. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and other industry standards or practices.

G. Certification from the Contractor that the system specified meets all identified code and insurance requirements as required by the Specification.

H. Material Safety Data Sheets (MSDS)

1.5 CODE REQUIREMENTS

A. The Contractor shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

Comply with pertinent provisions of Section 01 60 00.

A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

B. Provide continuous protection of materials. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

D. As a general rule all adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C). Read instructions contained on adhesive canister for specific storage instructions.

E. Do not store liquids where temperatures are, or are expected to be, below 40 degrees F.

F. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

G. Any materials which the Owner and/or Manufacturer determine to be damaged shall be removed from the job site and replaced at no cost to the owner.

1.7 JOB CONDITIONS

A. Installation under adverse weather conditions may be done only after consultation with Manufacturer and shall be done in compliance with specifications.

B. Only as much of the new roofing as can be made weather tight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.

C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Contractor shall provide the necessary equipment to dry the surface prior to application.

E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

F. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

G. The Contractor shall consult with Manufacturer regarding compatibility, precautions and recommendations regarding presence of asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials on the existing roof.

H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Contractor shall provide all necessary

protection and barriers to segregate the work area and to prevent damage to adjacent areas as specified by Manufacturer.

I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.

J. The Contractor shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

K. All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

L. All new roofing waste material (i.e., scrap roof membrane, release paper, empty cans of adhesive) shall be immediately removed from the site by the Contractor and properly transported to a legal dumping area authorized to receive such material.

M. The Contractor shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

N. Contractor shall consult with Manufacturer prior to installation of membrane over coal tar pitch or a resaturated roof. Any special consideration to protect the membrane from volatile fumes and materials shall be included in the bid price.

O. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

P. All rooftop contamination that is anticipated or that is occurring shall be reported to Manufacturer to determine the corrective steps to be taken.

Q. The Contractor shall verify that all roof drain lines are functioning correctly before starting work. Contractor shall report any such blockages in writing to the Owner for corrective action prior to the installation of the roof system.

R. Contractor shall immediately stop work if any concealed condition is discovered and shall immediately notify Owner of such condition in writing.

S. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction per Division 1.

T. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

U. The Contractor shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to help verify condition of the deck/substrate and to confirm expected pullout values.

V. Contractor shall consult Manufacturer for any required precautionary steps in the event that:

1. The roof assembly permits interior air to pressurize the membrane underside.

2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.

3. The wall/deck intersection permits air entry into the wall flashing area.

W. Precautions shall be taken when using any adhesives, sealants, or other such chemicals at or near rooftop vents or air intakes to prevent odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of odors while ventilating the building. Keep lids on unused cans at all times.

X. Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

Y. Contractor shall comply with all OSHA and other relevant fall protection standards when working on roofs.

1.8 BIDDING REQUIREMENTS

A. Bidders shall visit the site and carefully examine the areas in question as to conditions that may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the Contractor. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions.

1.9 WARRANTIES

A. The roofing contractor shall provide a written guarantee, signed by an officer of the firm, stating that the Contractor will make good, at his own expense, any leak in the roofing for a period of five (5) years other than those caused by third-party damage and/or acts of nature.

B. In addition to the above, provide a 15 year unlimited guarantee provided by the Manufacturer and Contractor of the roofing and flashing materials. Warranty shall be no dollar-limit type and shall not exclude ponding water.

C. Contractor's Warranty: Upon the completion of the work and as a condition of its acceptance, deliver to the City Architect four (4) copies of the "Roofing Guarantee," Alabama Building (See Section 00637), signed by the General Contractor (all original signatures). This guarantee shall be in addition to manufacturer's warranty required above, the cost of which shall be included in the contract price.

D. The Guarantee and Warranty shall be governed by the laws of the State of Alabama and be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents, and shall not limit or deprive the Owner of any other rights the Owner may have for remedy. [REMOVE PARAGRAPH IF PROJECT IS NOT A STATE JOB]

PART 2 - PRODUCTS

2.1 GENERAL

A. The mechanically-attached roof system shall be PVC, fabric reinforced, 60 mil. Approved manufacturers are Duro-Last, Sarnafil, Fibertite, Mule-Hide, Versico or approved equal.

B. PVC roofing system shall be supplied by a single manufacturer which has successfully manufactured raw materials into a specified product for not less than ten (10) years. No secondary private labels are acceptable. Provide secondary materials such as, but not limited to, insulation, gypsum board, vapor barriers, etc. as recommended and approved by manufacturer of primary materials.

C. In accordance with Act Number 97-225, Bill Number H-275 enacted by the 1997 Legislature of Alabama, the Contractor shall use in the execution of the contract materials, supplies, and products manufactured, mined, processed, or otherwise produced in the United States or its territories, if same are available at reasonable and competitive prices. Refer to Section 00800-13.13.1

D. Provide other materials, not specifically described but required for a complete and proper installation, subject to the approval of the City Architect.

2.2 MEMBRANE

A. PVC Sheet: ASTM D4434 (latest version), "Standard for Polyvinyl Chloride Sheet Roofing" Classification: Type III, polyester reinforced as follows:

1. Minimum 10 x 10 strands/inch polyester reinforced PVC thermoplastic membrane

2. Thickness: 60 mil (1.50 mm) nominal [VERIFY THICKNESS]

3. Exposed Face Color: White

2.3 FLASHING MATERIALS

A. Contractor shall provide and install any required Wall/Curb Flashing, Perimeter Edge Flashing, Miscellaneous Flashing, adhesives, and sealants compatible with roof membrane as required to provide a complete and watertight installation in accordance with Manufacturer's recommendations and specifications. Contractor shall carefully examine the field condition of the existing roof, including all changes of plane, edges, terminations, curbs, vents, openings, joints, and penetrations, and select the proper materials based upon the Manufacturer's requirements for each condition.

2.4 INSULATION/OVERLAYMENT/RECOVER BOARD

A. In areas that are required to receive replacement insulation, Contractor shall provide and install manufacturer-approved underlayment board with proper facer, in size and thickness as required.

2.5 ATTACHMENT COMPONENTS

A. Contractor shall provide and install any required fasteners compatible with roof membrane, flashings, insulation, underlayment, substrate, and other materials as required to provide a complete and watertight installation in accordance with Manufacturer's recommendations and specifications. Contractor shall carefully examine the field condition of the existing roof, including all changes of plane, edges, terminations, curbs, vents, openings, joints, and penetrations, and select the proper materials based upon the Manufacturer's requirements for each condition.

2.06 DECK PRIMERS

A. Contractor shall use Manufacturer's recommended primer materials.

2.7 WALKWAY PROTECTION

A. Provide non skid, maintenance-free PVC walkway pads properly secured per Manufacturer's recommendations around all serviceable roof top units in accordance with membrane manufacturer. Walk pads must be manufactured by the roof membrane manufacturer.

2.8 VAPOR BARRIER

Not applicable this job

2.9 MISCELLANEOUS ACCESSORIES

A. Contractor shall provide all necessary and required accessories and tools for a complete and watertight system and shall include in his bid price the cost of such.

2.10 SEALANTS AND PITCH POCKET FILLERS

A. Contractor shall carefully examine field conditions of the roof and provide and install per Manufacturer's specifications and recommendations any sealants, adhesives, or other such materials as required to properly seal any roof penetrations or similar items. Wherever possible, Contractor shall eliminate pitch pockets around roof penetrations and install preformed boots and seals by the same manufacturer as the roof membrane. Sealants and Pitch Pocket filler shall be covered under the warranty and not listed as maintenance items.

2.11 MISCELLANEOUS FASTENERS AND ANCHORS

A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel as required by field conditions and recommended by Manufacturer. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

2.12 RELATED MATERIALS

A. Wood Nailer

Contractor shall examine all existing wood nailers and remove any rotted wood and replace with new treated wood nailers, and shall also install new treated wood nailers at the perimeter of the entire roof, and around roof projections and penetrations. Thickness of nailers shall match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

PART 3 – EXECUTION

3.1 PRE-CONSTRUCTION CONFERENCE

A. The Contractor, Owner, and Manufacturer(s) shall attend a pre-construction conference.

B. The meeting shall discuss all aspects of the project including, but not limited to:

1. Safety
2. Set up
3. Construction schedule
4. Contract conditions
5. Coordination of the work

3.2 SUBSTRATE CONDITION

A. Contractor shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.

B. Contractor shall verify that the work done under related sections meets the following conditions:

1. Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
2. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
3. All surfaces are smooth and free of dirt, debris and incompatible materials.

4. All roof surfaces shall be free of water, ice and snow.

3.3 SUBSTRATE PREPARATION

The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Contractor shall load materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight.

A. Reroofing Over Existing Single Ply Roofing

The Architect and Contractor shall determine the condition of the roof deck and existing insulation. Any deteriorated decking or wet or deteriorated insulation materials shall be removed and replaced. Remove all debris from the existing single-ply roof and cut into panels in sizes as recommended by Manufacturer. Install a layer of Manufacturer-approved recover board or a new insulation board over the fastened panels and then fasten the board according to Manufacturer's requirements.

B. Reroofing Over Existing Bitumen Roofing

The Architect and Contractor shall determine the condition of the existing roof deck and old roof system. Any areas with deteriorated decking or wet insulation materials are to be removed and replaced.

1. On graveled surfaces, all debris shall be removed and loose gravel 1/4 – 3/8 inches (6mm -10mm) in size shall be leveled and maintained at 4 lbs./sq. ft. A minimum of 1/2 inch underlayment or manufacturer's current recommended thickness shall be used as a separator.

3.4 SUBSTRATE INSPECTION

A. A dry, clean and smooth substrate shall be prepared to receive the mechanically-attached roof system.

B. The Contractor shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

C. The substrate shall be clean, smooth, dry, and free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

D. All roof surfaces shall be free of water, ice and snow.

E. Membrane shall be applied over compatible and accepted substrates only.

3.5 VAPOR BARRIER/AIR BARRIER INSTALLATION

Not applicable this job.

3.6 WOOD NAILER INSTALLATION

A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations.

B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall also meet the requirements of the current Factory Mutual Loss Prevention Data Sheet 1-49.

C. Thickness shall be as required to match substrate and/or insulation height to allow a smooth transition.

D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration.

E. Stainless steel, corrosion resistant, fasteners are required when mechanically attaching product to wood nailers and wood products treated with ACQ (Alkaline copper Quaternary). When ACQ treated wood is used on steel roof decks or with metal edge detailing, a separation layer must be placed between the metal and ACQ treated wood.

3.7 INSULATION INSTALLATION

General Criteria:

A. Insulation shall be installed according to insulation manufacturer's instructions.

B. Insulation shall be neatly cut to fit around penetrations and projections.

C. Do not install more insulation board than can be covered with membrane by the end of the day or the onset of inclement weather.

D. Use at least 2 layers of insulation when the total insulation thickness exceeds 2-1/2 inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

E. Mechanical Attachment

1. Insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the insulation manufacturer's and membrane manufacturer’s recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also

cause the insulation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.

2. Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and membrane manufacturer.

3. Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

3.8 SEPARATION LAYER INSTALLATION

Approved separation layer shall be installed directly over expanded or extruded polystyrene (unless supplied with an approved, compatible facer).

A. General Criteria

1. Separation layer shall be installed according to Manufacturer's instructions.

2. Separation layer shall be neatly cut to fit around penetrations and projections.

3. Do not install more separation layer than can be covered with membrane by the end of the day or the onset of inclement weather.

4. Mechanical Attachment:

a. Separation layer shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to Manufacturer's recommendations for fastening rates and patterns.

b. Fasteners are to be installed in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by fastener manufacturer and membrane manufacturer.

3.9 MEMBRANE ATTACHMENT

A. The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

B. General

1. Membrane shall be attached with Manufacturer's recommended fasteners according to all code requirements and Manufacturer's recommendations and specifications.

2. Membrane overlaps shall be shingled with the flow of water where possible.

3. Full-width rolls of membrane shall be fastened perpendicular to the direction of the steel deck flutes where possible.

4. Tack welding of membrane full or half-width rolls for purposes of temporary restraint during installation is not permitted.

5. Apply membrane at perimeters and corners and in interior areas per Manufacturer's recommendations and specifications.

6. Hot-air weld overlaps according to Manufacturer's requirements. Seam test cuts shall be taken at least 3 times per day.

C. Securement Around Rooftop Penetrations

1. Manufacturer's recommended fasteners and washers shall be installed around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, according to Manufacturer's perimeter rate of attachment. Fasteners shall be installed using the fastener manufacturer's recommended torque-sensitive fastening tools with depth locators. Fasteners shall clamp the membrane tightly to the substrate.

2. Membrane flashings shall extend past any washers or other mechanical attachment devices to the distance recommended by the Manufacturer, and be hot-air welded to the deck membrane.

3.10 HOT-AIR WELDING OF SEAM OVERLAPS

A. General

1. All seams shall be hot-air welded. Seam overlaps shall be welded to the width and manner recommended by Manufacturer.

2. Welding equipment shall be provided by or approved by membrane manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by the membrane manufacturer prior to welding.

3. All membrane to be welded shall be clean and dry.

B. Quality Control of Welded Seams

1. The Contractor shall check all welded seams for continuity per the Manufacturer's recommendation. On-site evaluation of welded seams shall be made daily by the Contractor at locations as directed by the Manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Contractor at no extra cost to the Owner.

3.11 MEMBRANE FLASHINGS

A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Architect and Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Contractor's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building. All membrane flashings shall be adhered using Manufacturer's recommended materials and procedures and shall be installed per Manufacturer's specifications.

3.12 METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

1. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.

B. Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

C. Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

D. Metal joints shall be watertight.

E. Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).

F. Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.

G. Counter flashings shall overlap base flashings at least 4 inches (100 mm).

H. Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

3.13 WALKWAY INSTALLATION

A. Loose lay walkway on top of completed roof assemblies. Secure the walkway to the field sheet per Manufacturer's recommendations.

3.14 TEMPORARY CUT-OFF

A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.09. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.

B. If inclement weather occurs while a temporary waterstop is in place, the Contractor shall provide the labor necessary to monitor the situation to maintain a watertight condition.

C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Contractor's expense.

3.15 COMPLETION

A. Prior to demobilization from the site, the work shall be reviewed by the Architect and the Contractor. All defects noted and non-compliances with the Specifications or the recommendations of Manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Contractor to the satisfaction of the Architect and Manufacturer prior to demobilization.

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SECTION 07 56 00
COLD LIQUID-APPLIED PMMA/PMA FLASHINGS

PART 1 GENERAL

1.01 SUMMARY

A. The new roofing and waterproofing flashing system shall consist of a cold liquid applied reinforced waterproofing membrane and finish layers as specified.

B. Work shall include, but is not limited to, the following:
1. Preparation of existing flashing substrates.
2. Liquid applied, reinforced flashings.
3. All related materials and labor required to complete specified waterproofing necessary to receive specified manufacturer's warranty.

1.02 RELATED SECTIONS

A. Division 01
B. Division 011000 - Summary of Work
C. Division 072100 - Thermal Insulation

1.03 DEFINITIONS

A. ASTM D 1079- Standard Terminology Relating to Roofing and Waterproofing.
B. The National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual, Fifth Edition Glossary.

1.04 REFERENCES

A. AMERICAN SOCIETY OF CIVIL ENGINEERS - Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
B. AMERICAN STANDARD OF TESTING METHODS (ASTM):
1. ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)::
1. ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge System Used with Low Slope Roofing System.
2. ANSI/SPRI FX-1 - Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.

3. ANSI/SPRI IA-1 - Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
4. ANSI/FM 4474 - American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.

D. FACTORY MUTUAL (FM):
1. FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
2. FM 4470 - Approval Standard - Class I Roof Covers.

E. INTERNATIONAL CODES COUNCIL (ICC):
1. 2015 International Building Code (IBC).

F. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).
1. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
2. UL 1256 – Fire Test of Roof Deck Constructions.

1.05 ACTION SUBMITTALS

A. Product Data Sheets: Submit manufacturer's product data sheets, installation instructions and/or general requirements for each component.
B. Safety Data Sheets: Submit manufacturer's Safety Data Sheets (SDS) for each component.
C. Sample warranty from the manufacturer and contractor.
D. Provide roof plan and representative detail drawings.

1.06 INFORMATIONAL SUBMITTALS

A. Submit a letter from the roofing manufacturer indicating the contractor is an authorized applicator.

1.07 CLOSEOUT SUBMITTALS

A. Warranty: Provide manufacturer's and contractor's warranties upon project completion.

1.08 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS:
1. Manufacturer shall have 20 years of manufacturing experience.
2. Manufacturer shall have trained technical service representatives employed by the manufacturer, independent of sales.
3. Manufacturer shall provide site visit reports in a timely manner.

B. CONTRACTOR QUALIFICATIONS:
1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.

2. Applicators shall have completed projects of similar scope using same or similar materials specified.
3. Contractor shall provide full time, on-site superintendent or foreman experienced with the specified roofing from beginning through satisfactory project completion.
4. Applicators shall be skilled in the application methods for all materials.
5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.
6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.

C. FLASHING SUBSTRATE EVALUATION:

1. Contractor shall evaluate substrate moisture content and adhesion of waterproofing materials to substrate throughout the work and record with daily inspection reports or other form of reporting acceptable to the owner or his designated representative and waterproofing manufacturer.
   a. Moisture content: Evaluate substrate moisture content to determine acceptability for application of the specified liquid applied waterproofing materials. Moisture testing shall be performed by means suitable to the project application, or by testing substrate relative humidity (RH) in accordance with ASTM F 2170 when needed, required, or if substrate moisture content is in question.

   b. Adhesion: Evaluate soundness and surface preparation of concrete and/or masonry substrates. Prepare representative areas using specified methods complete with applied primer and waterproofing membrane. Test for minimum acceptable tensile bond strength values as required in accordance with ASTM D 4541. Evaluate all areas where concrete appears to differ in appearance or consistency, if multiple areas are involved in the scope of work, evaluate each area with a minimum of (3) tests for every 5,000 ft^2 or as required by project conditions.

D. SOLVENT CONTAINING ROOF MASTICS, COATINGS & ADHESIVES

1. Cold liquid applied PMMA/PMA flashings should not be applied on, over or in conjunction with newly applied solvent containing roof mastics, coatings and adhesives.

1.09 DELIVERY, STORAGE AND HANDLING

A. Refer to each product data sheet or other published literature for specific requirements.

B. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.

C. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.

D. When materials are to be stored outdoors, store away from standing water, stacked on raised pallets or dunnage, at least 4 in (100 mm) or more above ground level. Carefully cover storage with "breathable" tarpaulins to protect materials from precipitation and to prevent exposure to condensation.

E. Carefully store roof membrane materials delivered in rolls on-end with selvage edges up. Store and protect roll storage to prevent damage.

F. Properly dispose of all product wrappers, pallets, cardboard tubes, scrap, waste, and debris. All damaged materials shall be removed from job site and replaced with new, suitable materials.

1.10 SITE CONDITIONS

A. SAFETY:

1. The contractor shall be responsible for complying with all project-related safety and environmental requirements.
2. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified liquid applied or semi-solid roofing materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.
3. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified hot asphalt-applied materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions. .
4. The contractor shall refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

B. ENVIRONMENTAL CONDITIONS:

1. Monitor substrate and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.

2. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry, during the application of roofing materials. Ensure all roofing materials and substrates remain above the dew point temperature as required to prevent condensation and maintain dry conditions.
3. Contractor shall implement odor control measures where required during the application of waterproofing materials and adjust methods as necessary to accommodate varying project conditions.

1.11 WARRANTY

A. Manufacturer's Waterproofing Warranty: The manufacturer shall provide the owner with the manufacturer's warranty providing materials for 20 years from the date the warranty is issued.
B. The contractor shall guarantee the workmanship and shall provide the owner with the contractor's warranty covering workmanship for a period of 2 years from completion date.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. SINGLE SOURCE MANUFACTURER: All Liquid applied PMMA/PMA membrane and accessories shall be manufactured by a single supplier with 20 years or more manufacturing history in the US.
   1. Comply with the manufacturer's requirements as necessary to provide the specified warranty.
B. PRODUCT QUALITY ASSURANCE PROGRAM: Manufacturer shall be an ISO 9001 registered company. A 'Quality Compliance Certificate (QCC) for reporting/confirming the tested values of the membrane materials will be supplied upon request.
C. ACCEPTABLE MANUFACTURER:
   1. [Basis of Design] SOPREMA, located at: 310 Quadral Drive, Wadsworth, OH 44281; Tel: 800-356-3521; Tel: 330-334-0066; Website: www.soprema.us.
   2. Tremco Sealants
   3. Johns Manville
   4. Firestone Building Products
   5. Henry
   6. Carlisle Syntec

2.02 LIQUID APPLIED FLASHING SYSTEM

A. FLASHING MEMBRANE:
   1. POLYMETHACRYLATE FLASHING MEMBRANE (PMA):
      a. SOPREMA ALSAN RS 260 LO FLASH: Low odor, rapid curing, polymethacrylate (PMA) liquid resin with an embedded polyester

reinforcement fabric used for monolithic waterproofing flashing membranes.
i. VOC content: 0.5 g/L
ii. Color: Grey

2. POLYMETHYL METHACRYLATE FLASHING MEMBRANE (PMMA):
a. SOPREMA ALSAN RS 230 FLASH: Rapid curing, polymethyl methacrylate (PMMA) liquid resin with an embedded polyester reinforcement fabric used for monolithic waterproofing flashing membranes.
i. VOC content: 4.2 g/L
ii. Color: Grey
b. SOPREMA ALSAN RS DETAILER: Micro-fiber enhanced, rapid curing, polymethyl methacrylate (PMMA) paste resin used for flashing difficult penetrations where a resin/fleece/resin application is not practical.
i. VOC content: 2.6 g/L
ii. Color: Grey

3. FINISHING LAYER:
a. SOPREMA ALSAN RS 281 CLEAR FINISH: Rapid curing, clear polymethyl methacrylate (PMMA) liquid resin used to coat and seal colored silica quartz aggregate.
i. VOC content: 13.4 g/L
ii. Color: Clear

2.03 ACCESSORIES

A. PRIMERS:
1. SOPREMA ALSAN RS 222 PRIMER: Rapid curing, polymethyl methacrylate (PMMA) liquid resin used to promote adhesion of PMMA/PMA membranes over asphaltic substrates, wood, concrete and approved waterproofing board substrates.
a. VOC content: 2.5 g/L
b. Color: Clear
2. SOPREMA ALSAN RS METAL PRIMER: Solvent-based primer used to improve the adhesion of PMMA/PMA membranes to metal substrates.
a. VOC content: 550 g/L
b. Color: Off White

B. CATALYST:
1. SOPREMA ALSAN RS CATALYST POWDER: Reactive agent used to cure PMMA/PMA liquid resins.

C. REINFORCING FABRIC:
1. SOPREMA ALSAN RS FLEECE: Woven polyester reinforcement used in PMMA/PMA liquid applied membrane and flashing applications.

a. Thickness: 30-40 mils (0.8-1 mm)
b. Weights: 110 g/m^2
c. Width(s): Size as required.
d. Length: 164 ft. (50 m)

D. PASTE AND MORTARS:
1. SOPREMA ALSAN RS PASTE: Rapid curing, polymethyl methacrylate (PMMA) paste resin used to fill small cracks and voids on non-traffic bearing substrates prior to the application of PMMA/PMA membranes.
a. VOC content: 4.4 g/L
b. Color: Grey
2. POLYMETHACRYLATE MORTAR (PMA):
a. SOPREMA ALSAN RS 263 LO MORTAR: Rapid curing, polymethacrylate (PMA) liquid resin used for patching, repairs and leveling. Consists of ALSAN RS 223 Powder and ALSAN RS 240 LO liquid resin
i. SOPREMA ALSAN RS 240 LO: Low odor, rapid curing, polymethacrylate (PMA) liquid resin.
a) VOC content: 1.0 g/L
b) Color: Grey
ii. SOPREMA ALSAN RS 223 POWDER: Filler.
3. POLYMETHYL METHACRYLATE MORTAR (PMMA):
a. SOPREMA ALSAN RS 233 MORTAR: Rapid curing, polymethyl methacrylate (PMMA) liquid resin used for patching, repairs and leveling. Consists of ALSAN RS 223 Powder and ALSAN RS 210 liquid resin.
i. SOPREMA ALSAN RS 210: Rapid curing, polymethyl methacrylate (PMMA) liquid resin.
a) VOC content: 0.3 g/L
b) Color: Grey
ii. ALSAN RS 223 Powder: Filler.

E. CLEANER:
1. SOPREMA ALSAN RS CLEANER: Clear, blended solvent used to clean and prepare plastic and metal surfaces, and used to clean existing ALSAN RS surfaces prior to the application of PMMA/PMA liquid applied membrane and flashings.
a. VOC content: <5 g/L
b. Color: Clear

PART 3 EXECUTION

3.01 EXAMINATION

A. Examination includes visual observations, qualitative analysis, and quantitative testing measures as necessary to ensure conditions are satisfactory to begin, and remain satisfactory throughout the project.

B. The contractor shall examine all waterproofing substrates including, but not limited to: decks, walls, curbs, equipment, fixtures, and wood blocking.

C. The applicator shall not begin installation until conditions have been properly examined and determined to be clean, dry and, otherwise satisfactory to receive specified roofing and waterproofing materials.

3.02 FLASHING SUBSTRATE PREPARATION

A. Before commencing work each day, the contractor shall prepare all substrates to ensure conditions are satisfactory to proceed with the installation of specified materials.

B. Preparation of substrates includes, but is not limited to, the following:

1. General:
   a. All substrates must be clean, dry and free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, release agents, lacquers, or any other condition that would be detrimental to adhesion of primer and/or resin materials to the substrate. Most surfaces will require mechanical abrasion in the form of scarifying, shot-blasting or grinding to achieve a suitable substrate.
   b. Inspect all substrates and correct defects before application of waterproofing materials. Fill all surface voids 1/16 in (1.5 mm) or greater wide and/or deep with appropriate fill material.

2. Concrete Substrates:
   a. Concrete shall comply with requirements of ACI 301 and ACI 308.
   b. Concrete compressive strength: 3,500 psi for all primers or 2,500 psi minimum when use of a moisture mitigation primer is required.
   c. Relative humidity: Maximum 75 percent per ASTM F2170 unless otherwise approved.
   d. Surface: Scarify, shot-blast or grind to ICRI Concrete Surface Profile CSP 3 to CSP 5; CSP 3 being the preferred profile.
   e. Adhesion: Adhesion of specified primer and liquid applied membrane shall be minimum 220 psi for traffic bearing waterproofing applications or 116 psi for roofing or non-traffic bearing waterproofing applications per ASTM D4541.
   f. Areas of spalls, voids, bug holes and other deterioration on vertical or horizontal surfaces shall be repaired as required or recommended.

3. Masonry Substrates:

a. Walls shall be structurally sound built of hard kiln dried brick, reinforced concrete block, or waterproof concrete block construction.
b. Liquid applied membrane must not be applied over soft or scaling brick or block, faulty mortar joints, or walls with broken, damaged or leaking coping. Areas of spalls, voids, bug holes and other deterioration on vertical surfaces shall be repaired as required or recommended.
c. Walls of ordinary hollow tile or other materials which in themselves are not waterproofed, should not be accepted as suitable to receive liquid applied membrane unless properly waterproofed to prevent moisture infiltration from above or behind the new liquid applied membrane.
d. Relative humidity: Maximum 75 percent per ASTM F2170 unless otherwise approved.
e. Surface: Scarify, shot-blast or grind to ICRI Concrete Surface Profile CSP 2 to CSP 4.
f. Adhesion: Adhesion of specified primer and liquid applied membrane shall be minimum 220 psi for traffic bearing waterproofing applications or 116 psi for roofing or non-traffic bearing waterproofing applications per ASTM D4541.

4. Metal Substrates:
   a. Clean and prepare metal to near-white metal in accordance with SSPC – SP3 (power tool clean) to a point maximum 1/8 in (3 mm) beyond the termination of liquid applied membrane materials and wipe with solvent cleaner to remove oils, debris or contaminants.
   b. Stainless Steel Series 300 and 400: Abrade to provide rough, open surface and wipe with solvent cleaner to remove oils, debris or contaminants.
   c. Galvanized & Zinc-Rich Metals: Galvanized and/or zinc rich metals are coated with either a layer of oil to prevent white rust or is passivated which must be completely removed prior to applying primer or liquid applied waterproofing. This can be confirmed by applying a coat of copper sulfate solution to the prepared and cleaned galvanized/zinc metal. A properly prepared surface will turn black indicating the passivator has been removed. If the surface does not turn black, additional abrasive cleaning will be required.
   d. Adhesion: Examine metal substrates by conducting adhesion testing. Prime with specified metal primer where required to achieve adequate adhesion.

5. Rigid Plastics (PVC & ABS):

a. Rigid plastics should be lightly abraded, and wiped with solvent cleaner. Extend preparation maximum 1/8 in (3 mm) beyond the specified termination of the liquid applied membrane flashing materials.

6. Wood Substrates:
   a. Provide sanded ¾ in (19 mm) minimum thickness APA A-C, Group 1, Exterior or Exposure 1, 48 in (1220 mm) x 96 in (2440 mm) tongue & groove sheathing panels. Install all panels with "A" side up, edges supported by blocking or structural framing, fastened using only non-corrosive screw fasteners with heads installed flush with sheathing applied at 6 in (150 mm) minimum o.c. along panel edges and 12 in (300 mm) o.c. over intermediate supports and/or additional fastening as required by jurisdictional codes. All new plywood substrates shall be structural panels performance-rated pursuant to National Institute of Standards and Technology (NIST) voluntary product standard PS-1-95; identified with American Plywood Association (APA) grade designations.
   b. Hygroscopic building materials such as wood plank, timber or plywood will normally have higher moisture content (in the range of 8% to 12%) as they adsorb or desorb moisture to reach equilibrium moisture content with the surrounding air. Cold liquid applied primer and reinforced membrane should not be applied to damp or wet sheathing materials, but may be applied to materials with higher moisture contents as indicated above, provided the exposed surface is clean and dry. Ultimately, determinations of moisture content and the resulting bond strength should be performed periodically to determine acceptability. If poor adhesion or blistering occurs, substrate will require additional drying time before proceeding.
   c. After priming plywood panels, fill joint gaps, holes and cracks with proprietary PMMA paste or PMMA mortar. All joints must be covered with minimum 1 in (25 mm) wide bond breaker tape followed with minimum 6 in (150 mm) wide strips of cold liquid applied reinforced waterproofing membrane centered over joint. Cover knot holes or cracks with strips of cold liquid applied reinforced waterproofing membrane.

7. Acceptable Rigid Insulation & Roof Cover Boards:
   a. After panels, fill joint gaps, holes and cracks with proprietary PMMA paste or PMMA mortar. All joints must be covered with minimum 6 in (150 mm) wide strips of cold liquid applied reinforced waterproofing membrane centered over joint.

8. Smooth SBS Modified Bitumen and Asphalt BUR Membrane:

a. The top surface of existing smooth SBS modified bitumen or Asphalt BUR membrane shall be clean and dry. Remove all dust, dirt or debris from the surface of the membrane by broom, blower or power vacuuming.

9. Tie-In to Emulsion Coated or Smooth APP Modified Bitumen Membrane:
   a. The top surface of existing emulsion coated or smooth APP modified bitumen membrane shall be broadcast to excess with #1 (0.7 - 1.2 mm) kiln-dried quartz silica. Liquefy the top surface of the in place membrane using a torch and broadcast silica aggregate into the liquid asphalt to excess. After the asphalt has cooled, remove all loose granules, dust, dirt or debris from the surface of the membrane by broom, blower or power vacuuming.

10. Tie-In to PVC Single ply:
   a. Remove all contaminants and prepare substrate as needed to receive liquid applied waterproofing.
   b. Lightly scrub PVC membrane with an abrasive pad and wipe with acceptable cleaner.
   c. Adhesion: Examine substrates by conducting adhesion testing. Prime with specified primer where required to achieve adequate adhesion.

11. Tie-In to Other Single ply and Flashing Surfaces:
   a. Remove all contaminants and prepare substrate as needed to receive liquid applied waterproofing.
   b. Lightly scrub surface with an abrasive pad and wipe with acceptable cleaner.
   c. Adhesion: Examine substrates by conducting adhesion testing. Prime with specified primer where required to achieve adequate adhesion. If acceptable adhesion is not obtained, attempt higher degree of surface abrasion and repeat.

C. Where conditions are found to be unsatisfactory, work shall not begin until conditions are adjusted appropriately. Commencing of work shall indicate contractor's acceptance of conditions.

3.03 PRIMER APPLICATION (GENERAL)

A. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.

B. Examine all substrates and conduct adhesion peel tests as necessary to ensure satisfactory adhesion is achieved.

3.04 PMMA PRIMER APPLICATION

A. Mix primer resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified waterproofing materials.
C. Apply primer using brush or roller at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.
D. Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.
E. Allow primer to fully cure before membrane application.

3.05 EPOXY PRIMER APPLICATION

A. Low Odor Primer Applications:
1. Mix A and B parts using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
2. Apply primer to compatible, clean and prepared substrate preferably with falling temperature to reduce potential for pinholes from "off-gassing" and as required to enhance adhesion of new specified waterproofing materials.
3. Apply primer using notched squeegee and roller or brush at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.
4. When primer will be left exposed beyond recommended recot times, broadcast to excess with #1 (0.7 – 1.2mm) kiln-dried quartz into the final coat of epoxy primer while still wet at the rate of 140 lbs/100 ft^2 (7.0 kg/m^2) as a mechanical bonding layer. After cure, remove loose aggregate and keep dry until subsequent system components are applied.
5. Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.
6. Allow primer to fully cure and remove excess aggregate before membrane application.

3.06 METAL PRIMER APPLICATION

A. Mix primer resin approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified waterproofing materials.
C. Apply primer using brush or roller at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.
D. Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.

E. Allow primer to fully cure before membrane application.

3.07 SUBSTRATE PATCHING, LEVELING & REPAIR

A. GENERAL:
1. After priming and before commencing with application of liquid applied waterproofing, the contractor shall patch, level or repair all substrates as required to eliminate bug holes, voids, cavities, low spots, repair cracks or any other condition that may be detrimental to proper application of the liquid applied waterproofing.

B. PATCHING, LEVELING & REPAIRS:
1. Contractor shall use proprietary paste or resin-mortar for all patching, leveling or repairs wherever possible. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
2. Traffic bearing substrates: Use only resin-mortar for all substrate leveling, patching and repairs.
3. Non-traffic bearing horizontal or vertical substrates: Use paste or resin-mortar for all substrate leveling, patching and repairs.
4. Application:
   a. Install paste or resin-mortar over a fully cured primer.
   b. The substrate shall be dry and free of any dust or loose particles.
   c. Mix paste resin and/or resin-mortar using a slow speed agitator prior to pouring into a larger container.
   d. When required, combine the paste or resin-mortar with #1 (0.7 – 1.2mm) kiln-dried quartz aggregate as recommended for deep voids or large areas.
   e. Mix paste and/or resin-mortar and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of product that can be used within the application time.
   f. Apply the catalyzed paste and/or resin-mortar onto the substrate using a smoothing trowel, working the material into the surface for complete coverage and full adhesion.
   g. Paste and/or resin-mortar should be placed in lifts no greater than the maximum thicknesses recommended.
   h. If additional lifts will be required, broadcast top surface of the placed paste or resin-mortar with clean dry #1 (0.7 - 1.2 mm) kiln-dried quartz aggregate at approximately 25% coverage while the paste and/or resin-mortar is wet. Place next lift once the paste and/or resin-mortar has cured.

C. NON-MOVING (STATIC) CRACKS – 1 mm or less:
1. Determine that crack is non-moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin mortar or paste as required.

D. MOVING (DYNAMIC) CRACKS – 1 mm or less:
   1. Determine that crack is moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin-mortar or paste as required. After the resin-mortar or paste has cured, apply minimum 4 in (100 mm) wide strip of reinforced cold liquid applied membrane centered over crack.

E. MOVING (DYNAMIC) CRACKS – 3 mm or less:
   1. Determine that crack is moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin-mortar or paste as required. After the resin-mortar or paste has cured, apply bond breaker tape 5 times in width greater than the maximum anticipated expansion. Then cover with a strip of reinforced cold liquid applied membrane centered over crack sized to provided 2 in (50 mm) minimum cover beyond all side of the bond breaker tape but no less than 6 in (150 mm) minimum width.

F. MOVING (DYNAMIC) CRACKS – Greater than 3 mm:
   1. Moving cracks greater than 3 mm must be treated as an expansion joint.

3.08 INSTALLATION & STAGING

A. Follow accepted procedure for applying cold liquid applied membrane flashings to substrate. In all cases the substrate is prepared, primed, and flashings are installed to the in-situ waterproofing membrane. When applying broadcast aggregate, the aggregate should not be left subject to the elements and therefore must be top-coated with finish the same day of application whenever possible.

B. If work is interrupted for more than 12 hours, use manufacturer's proprietary cleaner to clean and reactivate applied primer, resin mortar, flashing membrane or field membrane transition areas. Cleaner should be allowed a minimum of 20 minutes evaporation time after application and covered within 60 minutes of application or as recommended by the manufacturer.

3.09 FLASHING MEMBRANE APPLICATION

A. General:
   1. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
   2. Provide a minimum vertical height of 8 in (200 mm) for all flashing terminations wherever possible. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope.
   3. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.

4. All flashing shall be terminated as required by the manufacturer. Cap flashings or counter flashings may be constructed of metal, stone, tile or other materials properly installed in accordance with industry-accepted practice.
5. Install all flashing membranes before installing field membranes.
6. The primed substrate shall be dry and free of any dust, loose particles or contaminants.
7. Precut reinforcing fleece to conform to terminations, transitions and penetrations being flashed. Ensure a minimum 2 in (50 mm) overlap of fleece at side laps and extend flashing 4 in (100 mm) minimum horizontally onto deck unless otherwise specified. Ensure the completed liquid applied flashing membrane is fully reinforced.
8. Wherever possible factory pre-cut fleece pipe penetration and universal corners shall be used.
9. Mix waterproofing resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of waterproofing resin that can be used within the application time.
10. Apply the base coat of catalyzed waterproofing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion.
11. Immediately apply the reinforcing fleece into the wet base coat of resin making sure the smooth side is up. Using a brush or roller, work the reinforcing fabric into the wet resin while applying the second coat of catalyzed waterproofing resin to completely encapsulate the fleece. Avoid any folds and wrinkles.
12. At membrane tie-ins, clean cured membrane with specified cleaner before application of adjacent membrane.

B. Penetrations

1. Pipes, Conduits, Posts, Supports and Unusual Shaped Penetrations:
   a. Pipes, conduits and other items to be flashed must be separated with ½ in (13 mm) minimum clearance or as recommended by manufacturer to adequate waterproof each individual penetration.
   b. All penetrations must be flashed individually. Two or more items ganged together in a flashing will NOT be permitted.
   c. Flash penetrations using cold liquid applied reinforced membrane or proprietary fibrated flashing resin as recommended. Flashing shall be applied using factory pre—cut fleece wherever possible consisting of a reinforced deck skirt/target flashing applied over a reinforced vertical wrap finger flashing.

2. Drains:

a. Flash drains using cold liquid applied membrane. Flashing shall consist of a membrane target extending minimum 12 in (300 mm) horizontally onto the substrate applied over a finger flashing extended into the prepared drain bowl a minimum of 3 in (75 mm).
b. At no time should the cold liquid applied membrane be installed to restrict or reduce the drain inlet in size.
c. For new drains, contractor shall include cost of all plumbing work, piping and connection to existing storm sewer system.

3. Hot Pipes:
a. Protect cold liquid applied membrane components from direct contact with steam or heat sources when the in-service temperature exceeds 150°F (65.5°C). In all such cases flash to an intermediate "cool" sleeve.
b. Fabricate "cool" sleeve in the form of a metal cone using non-ferrous metal in accordance with manufacturer details.
c. Flash sleeve using cold liquid applied reinforced membrane similar to a standard pipe flashing. Flashing shall consist of a reinforced target applied over a reinforced vertical wrap finger flashing.

4. Flexible Penetrations:
a. Provide a weather-tight gooseneck set in manufacturers resin paste and secured to the deck.
b. Flash gooseneck penetrations using cold liquid applied reinforced membrane as recommended. Flashing shall consist of a reinforced target and reinforced vertical wrap finger flashing.

5. Walls, Curbs and Bases:
a. Flash all walls, curbs and bases using cold liquid applied reinforced membrane. Wherever possible extend flashing up and over tops of walls, curbs and bases so the membrane terminates on the opposite face of the vertical element.

6. Expansion Joints:
a. Flash all expansion joints with minimum two layers of manufacturers cold liquid applied reinforced membrane applied over an expansion joint compressible filler, expansion tube, backer rod and/or bond breaker tape as recommended by manufacturer.

7. Non-standard Flashing Details:
When required, consult manufacturer for recommendations on flashing non-standard conditions, penetrations or protrusions.

C. Mud-set Masonry, Tile & Poured-In-Place Concrete (Bonding Layer):

1. For all areas to receive new direct applied cement, concrete, or mortar setting bed, apply a supplementary wearing coat of the membrane manufacturer's cold liquid applied resin.
   a. Using a lambswool roller, apply an even layer of cold liquid applied resin at the minimum consumption of 30 lbs/100 ft^2 (1.5 kg/m^2) or as recommended by the membrane manufacturer and broadcast #1 (0.7 - 1.2mm) kiln-dried quartz aggregate into the wet resin to excess for full coverage.
   b. Allow resin bonding layer to cure as recommended by the membrane manufacturer prior to continuing application or applying loads. Remove excess un-adhered aggregate from surface by broom, vacuum or oil-free blower prior to apply overburden.
   c. When required, consult manufacturer for recommendations on flashing non-standard conditions, penetrations or protrusions.

3.10 WATERPROOFING CONTINUITY TESTING & QC EVALUATION

A. Prior to applying overburden, surfacing or finishes, contractor shall conduct a complete evaluation of the installed waterproofing membrane and liquid applied flashings which shall include visual inspection as well as an acceptable method for (low voltage, high voltage or water-flood) continuity testing when required.
B. Immediately following evaluation and continuity testing, repair all deficiencies identified in liquid applied waterproofing membrane and flashings.
C. Upon satisfactory completion of all required repairs, proceed with application of all specified overburden, surfacing or finishes.

3.11 FLASHING SURFACING & FINISH

A. GENERAL:
   1. Where specified or required apply aesthetic surfacing and finish over cured membrane flashings.
   2. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
   3. Install surfacing and finish layers over fully cured membrane layer.
   4. The substrate shall be dry and free of any dust, loose particles or contaminants.
   5. Mix resins using a slow speed agitator prior to pouring into a larger container.
   6. Mix surfacing or finish resins with catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of product that can be used within the application time.

7. Apply the catalyzed surfacing or finish resin onto the substrate as recommended, working the material into the surface for complete coverage and full adhesion.
8. At tie-ins and previously applied membrane, clean cured surface with specified cleaner before application of subsequent resin materials.

B. SURFACING – AESTHETIC COLOR FINISH

1. Provide waterproofing manufacturer's proprietary monochromatic color finish resin to create a smooth and readily cleanable surface. This surfacing option is warranted for a period of 1 year from the date of completion. This surfacing option is not recommended where slip-resistant surfaces are required.

2. Surfacing Layer:
   a. Apply an even topcoat of pigmented finish resin using a roller or brush at minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling.

3.13 CLEAN UP

A. Uncured resin is considered a hazardous material. Unused resin must be catalyzed and cured prior to disposal.

B. Clean up and properly dispose of waste and debris resulting from these operations each day as required to prevent damages and disruptions to operations.

3.14 PROTECTION

A. Upon completion of new work (including all associated work), institute appropriate procedures for surveillance and protection of finished work during remainder of construction period. Protect all areas where waterproofing membrane has been installed.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 SECTION INCLUDES:

A. Fabricated sheet metal items, including flashings and counter flashings.

B. Special Flashing.

1.2 RELATED REQUIREMENTS:

A. Division 1 - Quality Requirements: General requirements for mock-ups.

B. Division 4 - Unit Masonry Assemblies: Through-wall flashings in masonry.

C. Division 6 - Rough Carpentry: Wood nailers.

D. Division 7 - Aluminum Soffit and Fascia System.

E. Division 7 - Gutters and Downspouts.

F. Division 7 - Joint Sealers.

G. Division 9 - Paints and Coatings: Field painting.

1.3 REFERENCE STANDARDS:

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test

Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2005.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.

C. ASTM B 32 - Standard Specification for Solder Metal; 2004.

D. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

E. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.

F. ASTM B 749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products; 2003.

G. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.

H. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.4 SUBMITTALS:

A. See Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples 6x6 inch in size illustrating metal finish color.

1.5 QUALITY ASSURANCE:

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 – PRODUCTS

2.1 SHEET MATERIALS:

A. Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch thick base metal.

B. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.032 inch thick; plain finish shop precoated with fluoropolymer coating of color as selected.

1. Fluoropolymer Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

C. Lead: ASTM B 749, 2.5 lb/sq ft thick.

2.02 ACCESSORIES:

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Sealant: Type specified in Section 07900.

D. Plastic Cement: ASTM D 4586, Type I.

E. Solder: ASTM B 32; Sn50 (50/50) type.

2.03 FABRICATION:

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18-inch-long legs; seam for rigidity, seal with sealant.

F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

2.04 SPECIAL FLASHING:

A. Waterproofing Underlayment - Under Shingle Roofs and Metal Siding (Occuring Over Solid Substrates): Self-Adhering, Rubberized Asphalt bonded to Polyethylene-Film, 40 mils (1.0 mm) thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Thermal stability: Unaffected at -20 deg. F.; ASTM D 1970.

1. "CCW-WIP 400", Carlisle Coatings & Waterproofing, Inc.: www.carlisle-ccw.com.

2. "Ice and Water Shield" [Basis of Design], W.R. Grace & Co. - Conn., Atlanta GA.

3. "WeatherLock Flex", Owens Corning Roofing and Asphalt, LLC: www.owenscorning.com.

B. Waterproofing Underlayment - Under Metal Roof or Horizontal Applications of Metal (Occurring Over Solid Substrates): Self-Adhering, Rubberized Asphalt bonded to Polyethylene-Film, 30 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to butyl rubber adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Thermal stability: Stable after testing at 240 deg. F., and unaffected at -20 deg. F.; ASTM D 1970.

1. "CCW WIP 300HT", Carlisle Coatings & Waterproofing, Inc.: www.carlisle-ccw.com.

2. "Ultra" [Basis of Design], W.R. Grace & Co. - Conn., Atlanta, GA:http://www.na.graceconstruction.com/underlayments/download/UL-005Q.pdf.

3. "WinterGuard HT", CertainTeed Corporation: www.certainteed.com.

C. Self-Adhering Flashing - Around Windows, Doors, and Critical Wall Penetrations: Self-adhesive, rubberized asphalt bonded to polyethylene film, cold applied tape, with silicone-coated release sheet; 40 mil thickness; 12" wide roll, or as required. Provide primer when recommended by flashing manufacturer.

1. "CCW-705-TWF", Carlisle Coatings & Waterproofing, Inc.: www.carlisle-ccw.com.

2. "Peel-N-Seal", Advanced Building Products Inc.: www.advancedflashing.com.

3. "Perm-A-Barrier Wall Flashing", W.R.Grace & Co.-Conn., Atlanta, GA:

A. www.na.graceconstruction.com.

4. "Ice & Water Shield Strips", W.R.Grace & Co.-Conn., Atlanta, GA.

D. Install 1-layer over substrate surface at the following locations:

1. 36-inches wide in all valleys, over all hips and ridges (18-inches on each side of each valley, hip ridge, and top ridge), and at perimeter edges of shingle roof planes; and below all metal roofing, and behind any metal wall panels and metal siding.

2. Where roofing planes intersect vertical walls and planes, turn edges up at least 8-inches.

E. Coordinate with, and refer to Division 7 Roofing and Siding Sections for additional information and requirements.

PART 3 – EXECUTION

3.1 EXAMINATION:

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION:

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.3 INSTALLATION:

A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

E. Install continuous through-wall flashing and sub-sill flashing with interior end dam prior to setting doors and windows. Typical at head and sill conditions. Jamb flashing to terminate in sub-sill flashing. Install metal head flashing at all window and door heads per manufacturer's standard detail.

F. Where sloping roof abutts a wall, integrate metal step flashing into the shingle roofing in accordance with best industry standards to provide weathertight joint.

G. Apply Waterproofing Underlayment in accordance with manufacturer's recommendations.

1. Lap in shingled manner.
2. Flash perimeter of wall openings.
3. Cover internal and external corners with additional layer of "special flashing".

END OF SECTION 07 62 00

SECTION 07 71 00

ROOF SPECIALTIES

PART 1-GENERAL

1.1 SECTION INCLUDES

A. Aluminum gutters and downspouts.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood blocking.

B. Section 07 62 00 – Sheet Metal Flashing & Trim

C. Section 07 90 00 - Joint Protection.

1.3 REFERENCES

A. ASTM B209 — Aluminum and aluminum alloy sheet and plate.

B. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free.

C. NRCA - Roofing and Waterproofing Manual.

D. SMACNA - Architectural Sheet Metal Manual.

E. AAMA 1405.0 — Specification for aluminum gutters and downspouts.

1.4 OUALITY ASSURANCE

A. Perform Work in accordance with SMACNA and NRCA standard details and requirements.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Manufacturer's Installation Instructions; Indicate special procedures and conditions requiring special attention.

PART 2-PRODUCTS

2.1 SHEET MATERIALS

A. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M); 0.040 inch thick.

1. Finish: Plain, shop pre-coated with PVDF (polyvinylidene fluoride) coating.

2. Color: As selected from manufacturer's standard colors.

B. Primer: Zinc molybdate type.

C. Protective Backing Paint: Zinc molybdate alkyd.

2.2 COMPONENTS

A. Gutters and downspouts: SMACNA rectangular style, profile as detailed.

B. Downspout Boots: Provide cast iron or pre-finished stainless steel downspout boots at all locations, unless otherwise noted:

1. Basis of Design:

a. Manufacturer: Piedmont Pipe Downspouts, Inc.; Contact Dave Driver (887) 489-0911.

b. Product: Powder coated 304 11 ga. Stainless steel

c. Finish: 40mil polyurethane coated finish, color to match downspouts.

d. Built-in cleanout

2. Acceptable Manufacturers/Substitutes:

a. Architectural Products Co.

b. Barry Craft, Model No. B25A, Cast iron.

3. Coordinate opening size with downspouts.

2.3 ACCESSORIES

A. Anchorage Devices: Type recommended by fabricator.

B. Gutter Supports: Straps.

C. Downspouts Supports: Brackets, unless otherwise indicated.

D. Splash Pads: Precast concrete type, size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

E. Fasteners: Aluminum with soft neoprene washers at exposed fasteners. Finish exposed fasteners same as gutters and downspouts.

F. Protective backing paint: FS TT — C494, bituminous.

2.4 FABRICATION

A. Form gutters and downspouts to profiles, and sizes indicated.

B. Fabricate with required connection pieces.

C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortions or defects detrimental to appearance or performance. Allow for expansion.

D. Hem exposed edges of metal.

E. Fabricate gutter and downspout accessories; seal watertight.

2.5 FACTORY FINISHING:

A. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

B. Exposed aluminum, downspouts and gutters to be prefinished with Kynar 500 fiberglass coating, color as selected by Architect.

PART 3-EXECUTION

3.1 INSPECTION

A. Verify that surfaces and conditions are ready to receive work.

3.2 INSTALLATION

A. Install gutters, downspouts and accessories in accordance with manufacturer's instructions.

B. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.

C. Secure all metal joints watertight.

D. Conform to drawing details included in SMACNA and NRCA manuals.

E. Set splash blocks under downspouts where indicated on drawings.

END OF SECTION 07 71 00

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SECTION 07 80 00

FIRE AND SMOKE PROTECTION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 DESCRIPTION OF WORK:

A. Work described in this Section includes:

1. Through penetration fire stopping in fire rated construction.

2. Construction-gap fire stopping at connections of the same materials and different materials in fire rated construction.

3. Construction-gap fire stopping occurring within fire rated wall, floor, floor-ceiling, and/or roof-ceiling assemblies.

4. Construction-gap fire stopping at the top of fire rated walls.

5. Through-penetration smoke-stopping in smoke partitions.

6. Construction-gap smoke-stopping in smoke partitions.

B. Related work Specified elsewhere includes:

1. For structural, finish, and fire protection materials: Refer to the appropriate Specifications Sections.

2. Fire dampers and manufactured devices: Refer to Division 15.

3. Raceway seals and manufactured electrical devices: Refer to Division 16.

C. Unless specifically indicated otherwise, the party, trade, or subcontractor whose work penetrates fire-rated construction and/or fire-rated assemblies, shall be responsible for fire stopping around their own penetrations.

D. In the event the General Contractor employs a Specialty Subcontractor for the required fire stopping work, they shall notify all prospective Bidders, so as to avoid duplication in pricing.

1. The Specialty Subcontractor shall provide coordination of requirements and the related work of other trades in advance of and as the Work progresses.

1.3 REFERENCED STANDARDS:

A. Underwriters Laboratories - U.L. Fire Resistant Directory:

1. Through-penetration fire stop devices (XHCR).

2. Fire resistant ratings (BXUV).

3. Through-penetration firestop systems (XHEZ).

4. Fill, void, or cavity material (XHHW).

B. American Society for Testing and Materials Standards:

1. ASTM E 814: Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

2. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Underwriters Laboratories, Inc.:

1. UL 1479: Fire Tests of Through-Penetration Firestops.

2. UL 723: Surface Burning Characteristics of Building Materials.

1.4 DEFINITIONS:

A. Assembly: Particular arrangement of materials specific to given type of construction described or detailed in referenced documents.

B. Barriers: Time rated fire walls, smoke barrier walls, time rated floor-ceiling and roof-ceiling assemblies, and structural floors and walls.

C. Fire stopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses, and smoke.

D. Penetration: Opening or foreign material passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. Construction Gaps: Gaps between adjacent sections of walls, exterior walls, at wall tops between top of wall and ceiling, and structural floors or roof decks; and gaps between adjacent sections of structural floors.

F. System: Specific products and applications, classified and numbered by Underwriters Laboratories, Inc., to close specific barrier penetrations.

G. Sleeve: Metal fabrication or metal pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

1.5 SYSTEM DESCRIPTION:

A. Design Requirements:

1. Fire Rated Construction: Maintain barrier and structural floor fire ratings including resistance to cold smoke at all penetrations, connections with other surfaces and/or types of construction, at separations required to permit building movement and sound and/or vibration absorption, and at other construction gaps.

2. Smoke Barrier Construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations, connections with other surfaces and types of construction and at all separations required to permit building movement and sound and/or vibration absorption, and at other construction gaps.

1.6 SUBMITTALS:

A. Product Data: Manufacturer's written specifications and technical data including the following:

1. Detailed specifications of construction and fabrication.

2. Manufacturer's current written installation instructions.

3. Summary of test data for each product intended for use and limitations. Include name and address of the required independent testing laboratory and compliances obtained.

B. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Details of each proposed assembly identifying intended products and applicable UL System number or UL Classified devices.

2. Manufacturer or manufacturer's representative shall provide qualified as needed.

C. Quality Control Submittals: Statement of qualifications.

D. Applicators' Qualifications Statement: List past projects indicating required experience.

1.7 QUALITY ASSURANCE:

A. Specialty Contractor's Qualifications: Firm experience in installation or application of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer, and to State, Local, and/or other authority having jurisdiction, where applicable.

2. At least 2-years' experience with systems intended for use.

3. Successfully completed at least five projects of similar size, scope, and complexity using the systems intended for use.

B. Local and State Regulatory Requirements: Submit forms or acceptance for proposed assemblies not conforming to specific UL Firestop System Numbers or UL classified devices and/or systems.

C. Materials shall have been tested to provide fire rating at least equal to that of the construction.

1.8 DELIVERY, STORAGE AND HANDLING:

A. Packing and Shipping:

1. Deliver products in original unopened packaging with legible manufacturer's identification.

2. Coordinate delivery with scheduled installation date, so as to allow minimum storage at site.

B. Storage and Protection: Store materials in a clean, dry, ventilated interior location. Store materials off of floor, and protect from soiling, abuse, moisture, and freezing. Follow manufacturer's written instructions when more stringent.

C. Remove damaged and/or contaminated materials immediately, legally dispose of offsite, and Replace, at Contractor's expense.

1.9 PROJECT CONDITIONS:

A. Existing Conditions:

1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding with work.

2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental Requirements:

1. Furnish adequate ventilation if using solvents.

2. Furnish forced air ventilation during installation if required by manufacturer and/or authorities having jurisdiction.

3. Keep Flammable materials away from sparks or flame.

4. Provide masking or drop cloths to prevent contamination of adjacent surfaces by fire stopping materials.

5. Comply with manufacturer's written recommendations for temperature and humidity conditions before, during, and after installation of fire stopping.

1.10 GUARANTEE:

A. Submit copies of written guarantee agreeing to repair or replace joint sealers which fail in joint adhesion, co-adhesion, abrasive resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, and/or general durability, and/or which appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality or characteristic of the material for the exposure indicated. The guarantee period shall be for 1-year from the date of "Substantial Completion."

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS:

A. Use only those listed in the UL Fire Resistance Directory for the UL System involved.

B. Products shall be as manufactured by one of the following, or pre-approved equivalent:

1. Dow Corning.
2. HILTI.
3. 3M Fire Protection Products.
4. Nelson Firestop Products.
5. Rector Seal Corp.
6. Specified Technologies, Inc.
7. Tremco, Div. of RPM Corporation.

C. All fire stopping products must be from a single manufacturer.

D. All trades shall use products from the same manufacturer.

2.2 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION:

A. Systems or devices listed in the UL Fire Resistance Directory under categories XHCR and XHEZ may be used, providing that they conform to the construction type, penetrant type, annular space requirements, and fire rating involved in each separate instance, and that the system be symmetrical for wall applications. Systems or devices must be asbestos-free.

1. Additional requirements: Withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the UL system or device, and designated to perform this function.

2.3 CONSTRUCTION-GAP FIRE STOPPING OF FIRE-RATED CONSTRUCTION:

A. Fire stopping at construction gaps between edges of floor slabs and exterior wall construction.

B. Fire stopping at construction gaps between tops of partitions and underside of structural systems.

C. Fire stopping at construction gaps between tops of partitions and underside of fire-rated ceiling or ceiling assembly.

D. Fire stopping of control joints in fire rated masonry partitions.

E. Fire stopping expansion joints.

F. Acceptable manufacturers and products: Use only those listed in the UL Fire Resistant Directory for the UL System involved.

2.4 SMOKE STOPPING AT SMOKE PARTITIONS:

A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration fire stopping in fire-rated construction, as specified in the "Referenced Standards" is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded, as applicable.

B. Construction-gap smoke-stopping: Any system complying with the requirement for construction-gap fire stopping in fire-rated construction, as specified in the "Referenced Standards" is acceptable, provided that the system includes the specified smoke seal or will provide the smoke seal. The length of time of the fire resistance may be disregarded, as applicable.

2.5 ACCESSORIES:

A. Fill, void, and cavity materials: As classified under category XHHW in the UL Fire Resistance Directory.

B. Forming materials: As classified under category XHKU in the UL Fire Resistance Directory.

PART 3 – EXECUTION

3.1 EXAMINATION:

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion. Notify the General Contractor of such conditions.

1. Verify barrier penetrations are properly sized and in suitable conditions for application of materials.

2. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION AND CLEANING:

A. Clean surfaces to be in contact with penetration seal materials, of dirt, grease, oil, loose materials, rust or other substances, that may effect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION:

A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's written instructions and recommendations.

B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.

C. Where floor openings without penetrating items are more than 4-inches in width and subject to traffic or loading, install fire stopping materials capable of supporting same loading as required for floor system.

D. Protect materials from damage on surfaces subject to traffic.

E. Place fire stopping in annular space around fire dampers before installation of damper's anchoring flanges, which are to be installed in accordance with fire damper manufacturer's written recommendations, unless specifically indicated otherwise.

F. Where large openings are created in walls, or floors to permit installation of pipes, ducts, cable tray, bus duct, or other items, close unused portions of opening with fire stopping material tested for the application.

G. Install smoke fire stopping as specified for fire stopping.

H. Where rated walls are constructed with horizontally continuous air space, double width masonry, or double stud frame construction, provide vertical, 12-inch wide fiber dams for full thickness and height of air cavity at maximum intervals of 15'-0" on center.

3.4 FIELD QUALITY CONTROL:

A. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by the Architect, building inspector, fire inspector, and/or other authority having jurisdiction.

C. Perform under this Section patching and repairing of fire stopping caused by cutting or penetration by other trades, and/or by any other cause.

3.5 ADJUSTING AND CLEANING:

A. Immediately clean-up spills of liquid components.

B. Neatly cut and trim materials as required.

C. Remove equipment, materials and debris, leaving area in undamaged and clean condition.

D. Legally dispose of excess materials, trash, debris, etc., off of site.

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SECTION 07 90 00

JOINT SEALERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Division 1 - Quality Requirements: General requirements for mock-ups.
2. Division 3 - Cast-In-Place Concrete.
3. Division 4 - Unit Masonry Assemblies.
4. Division 7 - Sheet Metal Flashing and Trim.
5. Division 9 - Gypsum Board Assemblies.
6. Division 9 - Paints and Coatings.
7. Divisions 22-26 - (Joint sealers for mechanical and electrical work)

1.2 DESCRIPTION OF WORK:

A. Work described in this section includes joint sealer systems.

1.3 SYSTEM PERFORMANCES:

A. Provide joint sealers that have been produced and installed to establish and maintain watertight and airtight continuous seals.

1.4 SUBMITTALS:

A. Product Data: Submit manufacturer's complete product specifications, handling/installation/curing instructions, color charts and performance tested data sheets for each product required.

1.5 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an Installer who has successfully completed within the last three years at least 3 joint sealer applications similar in type and size to that of this project and who will assign mechanics from these earlier applications to this project, of which one will serve as lead mechanic.

B. Single Source Responsibility for Joint Sealer Materials: Obtain joint sealer materials from a single manufacturer for each different product required.

1.6 DELIVER, STORAGE AND HANDLING:

A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multi-component materials.

B. Store and handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS:

A. Environmental Conditions: Do not proceed with installation of joint sealers under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturer or below 40 degrees F.

2. When joint substrates are wet due to rain, frost, condensation or other causes.

B. Joint Width Conditions: Do not proceed with installation of joint sealers when joint widths are less than allowed by joint sealer manufacturer for application indicated.

C. Asbestos Prohibited.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL:

A. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.

B. Colors: Provide color of exposed joint sealers indicated, or if not indicated, as selected by Architect from manufacturer's standard colors.

2.2 ELASTOMERIC JOINT SEALANTS:

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those for Type, Grade, Class and Uses.

B. Multi-Part Nonsag Urethane Sealant: Type M, Grade NS, Class 25, Uses NR, M, A and, as applicable to joint substrates indicated, O.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Dynatrol 11" One-part; Pecora Corp.

b. "Sonolastic NP-2" Multi-component; Sonneborn.

c. "Dymeric 240/240FC" Multi-component; Tremco, Inc.

d. "Dymonic FC" One part; Tremco, Inc.

2. Locations for Use: Exterior joints and penetrations in vertical surfaces of concrete, and between metal and concrete, mortar of stone; overhead or ceiling joints; perimeters of metal frames in exterior walls; vertical expansion and control joints in masonry and concrete; and at all miscellaneous locations requiring a joint sealant.

3. Equivalent 1-part sealants will be acceptable for interior surfaces only, by one of the above-named manufacturers.

C. Two-Part Pourable Urethane Sealant: Type M, Grade P, Class 25; Uses T, M, A and, as applicable to joint substrates indicated, O.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Vulkem 45SSL"; Tremco, Inc.

b. "Pourthane"; W. R. Meadows, Inc.

c. "NR-200 Urexpan"; Pecora Corp.

d. "Sonolastic Paving Joint Sealant"; Sonneborn Building Products Div.,

e. "Rexnord Chem. Prod. Inc."

f. "THC-900/901"; Tremco, Inc.

2. Locations for Use: Exterior and interior expansion, control and construction joints in horizontal surfaces; and joints subject to pedestrian and light vehicular traffic.

3. Equivalent 1-part sealants will be acceptable for joints in exterior concrete paving only (Section 02520), by one of the above-named manufacturers.

D. One-Part Mildew-Resistant Silicone Sealant: Type S, Grade NS; Class 25, Uses NT, G, A and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide for sealing interior joints with nonporous substrates around ceramic tile, showers, sinks and plumbing fixtures.

1. Products: Subject to compliance with requirements, provide one of the following:

a. "Dow-Corning 786"; Dow Corning Corp.

b. "Dow-Corning 790"

c. "SCS 1702"; General Electric.

d. "863 #345 White"; Pecora Corp.

e. "Tremsil 200"; White, Clear; Tremco, Inc.

2. Locations for Use: Interior joints in vertical surfaces and terminal edges of tile; and joints at damp areas, such as around sinks and plumbing fixtures and pipe penetrations; and exposed terminal edges of vinyl flooring, such as around door frames and terminations at concrete.

E. Pre-Compressed Polyurethane Foam Sealant: Tremco "illmod 600": Expandable sealant for use at Mezzanine between CMU wall and mezzanine floor, and at other similar locations or where noted. Color: black.

F. Expansion (High Movement) Joint Sealants: One-part, neutral cure silicone material: Dow Corning 790 Silicone Building Sealant, or Tremco, Inc. Spectrem 1, Spectrem 3, Spectrem 4 TS (Tintable System).

G. Stucco or EIFS, provide one of the following:

1. Polyurethane, 1-part, non-yellowing aliphatic, equivalent to one of the following:
    a. Pecora "Dynatrol I-XL Tru-White".
    b. Sonneborn "Ultra".
    c. Tremco, Inc. "Dymonic FC".
2. Silicone, non-staining, neutral curing:
    a. "Spectrem 3", or "Spectrem 4-TS" - Tintable; Tremco, Inc.

H. Metal Composite Material Wall Panels Sealant: One part, cold-applied, non-sagging silicone material: Dow Corning 795 Silicone Building Sealant, or Tremco, Inc. Spectrem 2. Color: As selected.

2.3 LATEX JOINT SEALERS:

A. Acrylic-Emulsion Sealant: Manufacturer's standard, one-part nonsag, acrylic, mildew resistant, acrylic emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior and on protected exterior exposures involving joint movement of not more than + 7.5%.

1. Products: Subject to compliance with requirements, provide with one of the following:

    a. "Chem-Calk 600"; Bostik Construction Products Div.

    b. "AC-20"; Pecora Corp.

    c. "Sonolac"; Sonneborn Building Products Div; Rexnord Chemical Prod., Inc.

    d. "Tremflex 834"; Tremco Inc.

2. Locations for Use: Interior joints in field-painted vertical and overhead surfaces at perimeter of metal door frames, gypsum drywall, plaster and concrete or concrete masonry; and all other interior locations not indicated otherwise.

2.4 ACOUSTIC SEALANT

A. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.

1. Applications: Use for concealed locations only:

    a. Sealant bead between top stud runner and structure and between bottom stud track and floor.

2.5 FIRE-RESISTANT JOINT SEALERS

A. Refer to Section 07840 - "Firestopping," for additional information and detailed requirements.

2.6 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type which are non-staining; 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. Plastic Foam Joint-Fillers:

1. Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2. Backer Rod: Premium grade, closed cell polyethylene foam rod; Sealtight Backer Rod, as manufactured by W.R. Meadows, Inc., or approved equivalent.

3. Joint Filler: "Ceramar" flexible foam expansion joint filler, as manufactured by W.R. Meadows, Inc., or approved equivalent.

a. Thickness: 1/4".

C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing bond between sealant and joint filler or other materials at back (3rd) surface of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated.

B. Cleaners for Nonporous Surfaces: Provide non-staining, chemical cleaner of type acceptable to manufacturer of sealant and sealant backing materials which are not harmful to substrates and adjacent nonporous materials.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surface adjacent to joints.

PART 3 – EXECUTION

3.1 INSPECTION

A. Require Installer to inspect joints indicated to receive joint sealers for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Obtain Installer's written report listing any conditions detrimental to performance of joint sealer work. Do not allow joint sealer work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

1. Remove all foreign material from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; oil; grease; waterproofing; water repellents; water; surface dirt and frost.

2. Clean concrete, masonry, unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, acid washing or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.

4. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile and other non-porous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces which 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 SEALERS

A. General: Comply with joint sealer manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Latex Sealant Installation Standard: Comply with requirements of ASTM C 790 for use of latex sealants.

D. Installation of Sealant Backings:

1. Install sealant backings to comply with the following requirements:

2. Install joint-fillers of type indicated or recommended by sealant manufacturer to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

a. Do not leave gaps between ends of joint-fillers.

b. Do not stretch, twist, puncture or tear joint-fillers.

c. Remove absorbent joint-fillers which have become wet prior to sealant application and replace with dry material.

3. Install bond breaker tape between sealants and joint-fillers, compression seals or back of joints where required to prevent third-side adhesion of sealant to back of joint.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

F. Perform acoustical sealant application work in accordance with ASTM C 919.

G. Tooling of Nonsag Sealants:

1. Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

2. Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.4 PROTECTION AND CLEANING

A. Protect joint sealers during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

B. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

END OF SECTION 07 90 00

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SECTION 08 11 13

HOLLOW METAL 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. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Section 04 22 00 "Concrete Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Section 08 14 16 “Flush Wood Doors”.
3. Section 08 80 00 "Glazing" for glass view panels in hollow metal doors.
4. Section 08 71 00 "Door Hardware".
5. Section 09 90 00 “Paints & Coatings” for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.

3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.

6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.

13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.

2. Details of doors, including vertical and horizontal edge details and metal thicknesses.

3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

4. Locations of reinforcement and preparations for hardware.

5. Details of anchorages, joints, field splices, and connections.

6. Details of accessories.

7. Details of moldings, removable stops, and glazing.

8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies 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 (neutral pressure at 40" above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.

2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, 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.

3. Smoke Control Door Assemblies: Comply with NFPA 105.

   a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

   1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 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.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CECO Door Products.
2. Curries Company.
3. Steelcraft.
4. Or approved equal

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.

3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.

5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.

2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.

a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.

4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.

5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products Legion Series.

2. Curries Company 707 Series.

2.4 ENERGY-EFFICIENT HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design specified, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Energy Efficient Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.

1. Design: Flush panel.

2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".

a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on- center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.

b. Thermal properties to rate at a fully operable minimum U-Factor 0.29 and R-Value 3.4, including insulated door, thermal-break frame and threshold.

1) Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.36 and R-Value 2.7, including insulated door, kerf type frame, and threshold.

3. Level/Model: Level 2 and Physical Performance Level A (Heavy Duty), Minimum 18 gauge (0.042 inch - 1.1-mm) thick steel, Model 2.

4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".

7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

1. CECO Door Products Trio-E/Trio Series.

2. Curries Company 777 Trio-E/Trio Series.

2.5 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames, with the exception of knock down types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.

3. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.

4. Frames for Level 3 Steel Doors (48 inches and up in width): Minimum 12 gauge (0.081-inch -2.7-mm) thick steel sheet.

5. Frames for Level 2 Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.

6. Manufacturers Basis of Design:

   a. CECO Door Products SQ/SU/SR Series.

   b. Curries Company M/G Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.

3. Frames for Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.

4. Frames for openings up to 48 inches in width: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.]

5. Frames for openings 48 inches and wider in width: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.]

6. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.

7. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.

8. Manufacturers Basis of Design:

   a. CECO Door Products BQ/BU/DQ/DU/BR/DR Series (Drywall Profile).

   b. CECO Door Products SQ/SU/SR Series (Masonry Profile).

   c. Curries Company C/CM/CG Series (Drywall Profile).

   d. Curries Company M/G Series (Masonry Profile).

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.

3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

4. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

5. FEMA 361 Storm Shelter Anchors: Masonry T-shaped, wire masonry type, or existing opening type anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.8 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.

2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.

2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.9 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.10 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.11 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.

3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.

5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.

7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Two anchors per jamb up to 60 inches high.

        2) Three anchors per jamb from 60 to 90 inches high.

        3) Four anchors per jamb from 90 to 120 inches high.

        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.

        2) Four anchors per jamb from 60 to 90 inches high.

        3) Five anchors per jamb from 90 to 96 inches high.

        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.12 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

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 the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.

4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.

b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.

c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.

d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 08 11 13

SECTION 08 11 16

INTERIOR ALUMINUM 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. Pre-finished aluminum door frames for interior use.
2. Pre-finished aluminum framing systems for interior use.
3. Pre-finished aluminum doors for interior use.

B. Related Sections:

1. Section 08 80 00 "Glazing" for glass view panels in interior aluminum doors.
2. Section 08 43 13 Section "Aluminum-Framed Storefront" for glazed aluminum doors and framing used in exterior walls and vestibule enclosures.
3. Sections 08 14 16 "Flush Wood Doors", 08 14 23 "Clad Wood Doors", and 08 11 16 "Aluminum Doors and Frames".
4. Sections 08 71 00 "Door Hardware".

1.3 SUBMITTALS

A. Submit under the provisions of Section 01 33 00 "Submittal Procedures".

B. Product Data: For each type of product indicated. Include construction details, material descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

C. Templates: Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the interior aluminum door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

D. Shop Drawings: Include the following:

1. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

2. Locations of reinforcement and preparations for hardware.

3. Details of each different wall opening condition. Include requirements for steel framing at partitions for fit and securing of frames, partition widths and tolerances, direction of framing members, clips and attachments.

4. Details of anchorages, joints, field splices, and connections.

5. Details of accessories.

6. Details of moldings, removable stops, and glazing.

7. Elevations of each door design.

8. Details of doors, including vertical and horizontal edge details and metal thicknesses.

9. Details of preparations for power, signal, and control systems.

E. Samples for Verification: Provide at the request of architect, prepared Samples as indicated below:

1. Framing Member: 12 inches long.

2. Corner Fabrication: 12-by-12-inch-long, full-size window corner, including full-size sections of extrusions with factory-applied color finish.

3. Aluminum chips in full range manufacturer's standard finishes for architect's color selection.

F. Interior Aluminum Door and Frame Schedule: Use same designations indicated on Drawings. Coordinate with Door Hardware schedule and glazing.

G. Informational Submittals

1. Certificates of Compliance: Submit any product test report or information necessary to indicate compliance with this specification section.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain interior aluminum frames and doors through one source from a single qualified manufacturer.

B. Manufacturer Qualifications: A firm experienced in the manufacturing of interior aluminum framing systems and doors with a minimum five (5) years successful in-service performance providing product similar to those indicated for this project, including pre-engineering and pre-fabricating all components of aluminum framing systems and doors.

C. Installer Qualifications: An experienced installer with a minimum five years (5) experience who has completed aluminum framing systems and door installations similar in material, design, and extent to those indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

D. Aesthetic Effects: Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Fire-Rated Door Assemblies: Assemblies 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 (neutral pressure at 40" above sill) or UL 10C.

   1. Provide labels permanently fastened on each frame or door within size limits established by NFPA and the testing authority.

F. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.

G. Smoke-Control Door Assemblies: Comply with NFPA 105.

H. Pre-Installation Conference: Conduct conference in compliance with requirements in Section 01 31 00 "Project Management and Coordination" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing interior aluminum frames and doors and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver interior aluminum frames and doors individually protective wrapped within cartons and marked for the corresponding scheduled opening. Do not bulk pack frames.

B. Inspect frames upon delivery for damage.

1. Repair minor damage to pre-finished products as recommended by manufacturer.

2. Replace frames that cannot be satisfactorily repaired.

C. Store interior aluminum 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.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of interior aluminum frame openings by field measurements before fabrication and indicate measurements on Shop Drawings submittals.

B. Do not install aluminum frames and doors until area of work has been completely enclosed and interior is protected from the elements.

C. Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions.

1.7 WARRANTY

A. Provide manufacturer's written warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.

1. Warrant framing and door finishes against defects and excessive fading and non-uniformity in color for a period of 5 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Frameworks Manufacturing.
2. EFCO Corporation
3. Kawneer North America
4. United States Aluminum Corp.
5. Vistawall Architectural Products
6. YKK AP America, Inc.

B. Substitutions: Material from alternate interior aluminum framing system and door fabricators will not be accepted on jobsite without prior written and sample approval in accordance with requirements specified in Division 01 and at the discretion of Architect and their designated openings consultant.

2.2 MATERIALS

A. Extruded Aluminum: ASTM B 221 alloy 6063-T5 or alloy and temper required to suit structural and finish requirements.

B. SOUND CONTROL INTERIOR ALUMINUM FRAMES – FOR WOOD DOORS

1. Provide frames that are rated as STC35 and have been tested per ASTM E90 and ASTM E413. Provide interior aluminum framing components complying with dimensions, profiles, and relationships to adjoining work of components as indicated on Drawings. Reinforce for specified hinges, strikes, and closers. Frames are only to be used in conjunction with wood doors.

2. Type II Framing System: Provide frames with the following characteristics:

   a. Rectilinear design.

   b. Double rabbet profile.

   c. 1-1/2 inch face.

   d. Snap on trim:

      1) 1-1/4 inch.

      2) 1-1/2 inch.

      3) 2 inch.

   e. .062 inch rabbet wall thickness.

f. Throat sizes (drywall partition thickness): 4-7/8"

3. Sound Seals: Furnish all necessary sound seals required to meet rating requirements.

4. Fire Rated Frames: Fabricate frames in accordance with NFPA80, listed and labeled by a qualified testing agency. Maximum fire rating required is 20 minutes (without hosestream test).

C. INTERIOR ALUMINUM DOORS

1. General: Provide 1-3/4 inch doors of type and design indicated, not less than 0.062 inch thick material.

2. Aluminum Stile & Rail Type Swinging Doors: Door stiles and rails to have tubular design with the following characteristics:

a. Stiles:

1) Wide Stile (5").

b. Rails:

3. Snap-in stops with factory applied glazing gaskets for 1/4", 3/8", or 1/2" thick glass.

D. Aluminum Stile & Rail Sliding Type Doors: Subject to the same tubular design standards as Stile & Rail Type Swinging Doors with the following characteristics.

1. Sliding door track to be installed in properly blocked ceiling or wall above frame, or to header clip (by manufacturer) attached to the frame header. Sliding track to be provided with snap on covers.

2. Sliding Door Hardware:

a. Tricycle Rollers: 2 each per panel. Maximum 1 each roller per 75 lbs.

b. Provide bumper stops in track assemblies.

c. Provide concealed door guide at floor (track assemblies are not allowed).

2.3 ACCESSORIES

A. Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.

B. Door Silencers: Manufacturer's standard continuous mohair, wool pile, or vinyl seals.

C. Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.

D. Glazing: Comply with requirements in Section 08 80 00, "Glazing."

E. Hardware: As specified in Section 08 71 00, "Door Hardware".

2.4 FABRICATION

A. FRAME CONSTRUCTION

1. Factory pre-engineer and pre-cut interior aluminum frame components to the greatest extent practical. Linear glazing components fabricated in the field are not allowed. Allow for 2 inches excess vertical length for scribing to suit floor conditions. Machine jambs and prepare for hardware, with concealed plates, drilled and tapped as required, fastened in frame with concealed screws.

2. Provide concealed corner reinforcements and alignment clips for precise joints at butt or mitered connections.

3. Hardware Preparation: Factory interior aluminum frames to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates as specified in Division 08 Section, "Door Hardware."

   a. Reinforce frames to receive surface mounted door hardware. Machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within frame with concealed screws.

   b. Locate hardware as indicated.

   c. Coordinate locations of conduit, wiring boxes, and power transfers for electrical connections with Division 26 Sections.

4. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.

5. Fabricate all components to allow secure installation without exposed fasteners.

B. DOOR CONSTRUCTION

1. Factory pre-engineer aluminum doors and components to the greatest extent practical.

2. Hardware Preparation: Factory interior aluminum doors to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates as specified in Division 08 Section, "Door Hardware."

   a. Reinforce doors to receive surface mounted door hardware. Machine and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within door with concealed screws.

   b. Locate hardware as indicated.

   c. Coordinate locations of conduit and power transfers for electrical connections with Division 26 Sections.

3. Clearances for Non-Fire-Rated Door Frames: Not more than 1/8 inch at jambs and heads, not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.

4. Fabricate kits for glazing with removable stops to allow glazing replacement without dismantling.

2.5 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products' for recommendations for apply and designated finishes. Exposed surfaces to be free of scratches and other serious blemishes.

B. Factory finish extruded frame components so that any part exposed to view upon completion of installation will be uniform in finish and color.

C. Clear anodic coating: Comply with AAMA 607.1.

1. Class 2, AAM12C22A31 clear anodized coating, 0.4-.07 mill thickness minimum.

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 the Work.

B. Verify wall thickness does not exceed standard tolerances allowed by specified frame throat sizes.

C. General Contractor to verify the accuracy of dimensions given to frame and door manufacturer for pre-cut openings.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install and set interior aluminum frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

1. At fire-protection-rated openings, install frames according to NFPA 80.

B. Install frame components in the longest possible lengths with no component less than 48 inches.

1. Fasten to suspended ceiling grid at 48 inches on center maximum, using #6 sheet metal screws or other fasteners approved by frame manufacturer.

2. Use concealed installation clips to produce tightly fitted and aligned splices and connections.

3. Secure clips to extruded main-frame components and not to snap-in or trim members.

4. Do not use screws or other fasteners exposed to view when installation is complete.

3.3 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition.

B. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended by frame manufacturer and according to AMMA 609 & 610.

C. Touch up marred areas so that touch up is not visible from a distance of 48 inches. Remove and replace frames that cannot be satisfactorily repaired.

3.4 PROTECTION

A. Provide protection as required to assure that frames will be without damage or deterioration upon substantial completion of the project.

END OF SECTION 08 11 16

SECTION 08 14 23

CLAD WOOD DOORS

PART 1 -GENERAL

1.1 SUMMARY:

A. Work under this section comprises of furnishing solid core doors (decorative laminate faces) light frames, factory fitting and machining and factory finishing for fire labeled and non-labeled doors.

B. Any omission of reference to items required to complete the installation of products or systems of this section does not relieve the contractor the obligation to provide same.

1.2 RELATED WORK:

1. Section 06 20 00 – "Finish Carpentry"
2. Section 08 11 13 – "Hollow Metal Doors and Frames"
3. Section 08 43 13 – "Aluminum-Framed Storefronts"
4. Section 08 71 00 – "Door Hardware"
5. Section 08 80 00 – "Glazing"

1.3 REFERENCES:

A. STANDARDS

1. NFPA-80 – Fire Doors and Windows
2. NFPA-105 – Recommend Practice for Installation of Smoke Controlled Door Assemblies
3. WDMA I.S. 1A – Wood Door Manufacturer's Association, Flush Wood Door Performance Standards
4. UL10C - Standard for Positive Pressure Fire Tests of Door Assemblies

B. CODES

1. NFPA-101 – Life Safety Code

2. IBC 2003 – International Building Code

3. ANSI-A117.1 – Accessible and Usable Buildings and Facilities.

4. ADA – Americans with Disabilities Act

1.4 SUBMITTALS:

A. Submit shop drawings showing fabrication and installation of wood doors. Include details of door elevations, details of construction, location and installation requirements of door hardware.

B. Provide a schedule of doors and frames suing reference numbers and door openings as those on the contract documents. Shop drawings should include the following information:

1. Door core material

2. Mortises and reinforcements.

3. Glazed and louvered openings and material.

4. Mounting locations of standard hardware.

5. Elevation drawings.

C. Samples: Provide the following:

1. Corner sections of doors approximately 8" x 10" with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required.

2. Louver blade and frame sections, 6-inches long, for each material and finish specified.

1.5 QUALITY ASSURANCE

A. Substitutions: All substitution requests must be submitted within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the Architect and their consultants.

B. Manufacturer Qualifications:

1. Manufacturer shall be a member in good standing of the Wood Door Manufacturer's Association (WDMA).

2. Wherever possible obtain wood doors from a single source to ensure uniformity in quality of appearance and construction. All material

supplied for this project to conform to WDMA I.S. 1A-97 for premium grade wood doors.

C. Fire Rated Doors:

1. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with hardware and other door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and UBC 7-2, Fire Tests of Door Assemblies.

   a. Certification(s) of compliance shall be made available upon request by the Authority having Jurisdiction.

   b. For units exceeding sizes of tested assemblies provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

2. A physical label to be permanently affixed to the fire door at an authorized facility. Furthermore, all 45, 60, and 90 minute label doors are to have manufacturer's standard laminated stiles for improved screw holding and split resistance capability.

1.6 DELIVERY, STORAGE AND PROTECTION:

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Doors are to be shipped from manufacturer in individual polybags, and shall be inspected immediately upon arrival at jobsite for any damage of defects.

B. Identify each door with individual opening numbers that correlate with designation system used on shop drawings and contract drawings for door, frames and hardware. Use only temporary, removable, or concealed markings.

C. Do not deliver or install doors until building is enclosed and weather tight, wet-work is complete and dry, and HVAC system is operating and maintaining ambient temperature and relative humidity at occupancy level in storage and installation areas.

1.7 WARRANTY

A. Warranties shall be in addition to, and not a limitation of other rights the owner may have under the contract documents.

B. Submit written warranty on manufacturer's standard form signed by manufacturer agreeing to replace or repair defective doors which have:

1. Delamination in any degree.
2. Warp or twist of 1/4" or more in any 3'x6"x7' plane of door face.
3. Telegraphing of stile, rail or core through face to cause surface variation in excess of 1/100" in any 3" spans.

C. Contractor shall replace or refinish doors where contractor's work contributed to rejection or voiding of manufacturer's warranty.

D. Solid core interior doors shall be warranted for the life of their installation.

PART 2-PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Maiman Company

B. Graham Wood Doors.

C. Mohawk

D. Or Approved Equal

2.2 FIRE RATED DOORS:

A. All fire rated doors shall be supplied to meet UL10C positive pressure standards for category "A" doors. All required intumescent seals shall be concealed into the edge of the door, frame applied intumescent seals are not acceptable.

2.3 LOW-PRESSURE DECORATIVE LAMINATE FACES:

A. Low-pressure decorative laminates faces shall be thermally fused to cores under heat and pressure, complying with Laminating Materials Association's Product Standard and Typical Physical Properties of Decorative Overlays. LMA.2003.

B. Exposed edges shall be of an impact-resistant polymer edging, minimum .040" thick, applied to all four edges after faces; color or wood grain pattern shall be the same as the faces.

C. Provide doors with pilot holes factory-drilled for vertical edge hinges and lock sets.

D. Core: Particleboard type M-2.

E. Color or Wood Grain Pattern: Color to be selected from manufacturers standard colors

F. Basis of Design: Maiman Company: LPDL

Marshfield: Signature Series

2.4 LOUVERS:

A. Provide manufacturer's standard solid wood louvers unless otherwise indicated; species shall be the same as door faces.

B. Provide metal louvers with vision-proof inverted V or inverted Y blades constructed of galvanized 0.040 inch thick steel factory primed for paint finish with baked-enamel or power-coated finish.

C. Provide metal louvers for fire-rated doors with fusible link and closing device listed and labeled for use in doors with fire-protection rating of-1 1/2 hours or less. Subject to compliance with rating requirements, louver construction and material shall be the same as non-rated versions.

2.5 FABRICATION:

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of 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 measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2. Premachine metal astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

1. Trim openings with moldings of material and profile indicated.

PART 3-EXECUTION

3.1 INSTALLATION:

A. Examine installed 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 plumb jambs and level heads.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. For hardware installation, see Division 8 Section "Door Hardware."

B. Install wood doors to comply with manufacturer's written instructions, referenced quality standard and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Align factory fitted doors in frames for uniform clearance at each edge.

3.3 ADJUSTING AND PROTECTING:

A. Adjust hardware for smooth and balanced door movement. Rehang or replace doors that do not swing or operate freely.

B. Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

3.4 SCHEDULE:

A Refer to Door Schedule in the Drawings.

B. Coordinate throat opening width with wall and partition thickness.

END OF SECTION 08 14 23

SECTION 08 31 13

ACCESS DOORS AND PANELS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Access door and frame units, fire-rated and non-fire-rated, in wall, and ceiling locations.

1.2 RELATED REQUIREMENTS

A. Section 04 22 00 - Concrete Unit Masonry: Openings in masonry.

B. Section 06 10 00 - Rough Carpentry: Openings in partitions.

C. Section 09 21 16 - Gypsum Board Assemblies: Openings in gypsum ceilings or partitions.

D. Section 09 90 00 - Paints and Coatings: Field paint finish.

1.3 SUMMARY

A. This Section includes access doors for installation in the following types of new construction:

1. Gypsum drywall.

2. Unit masonry.

3. Aluminum soffit.

4. As otherwise indicated.

B. Provide fire-rated access doors where indicated or scheduled, and at access openings in all walls of stairs, elevator shafts and equipment rooms, other shafts and plumbing chase walls which are partially or fully open through floors, and at walls and ceilings indicated or required by Code to be fire-rated.

1.4 REFERENCE STANDARDS

A. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.5 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of all access door units.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Project Record Documents: Record actual locations of all access units.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code for fire rated access doors.

1. Provide access doors of fire rating equivalent to the fire rated assembly in which they are to be installed.

2. Provide products listed and labeled by UL as suitable for the purpose specified and indicated.

B. Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door assembly with panel door, frame, hinge, and latch from manufacturer listed in Underwriters Laboratories, Inc.'s “Building Materials Directory” for rating shown.

1. Provide UL label on each fire-rated access door.

2. Fire rating label must be accessible, permanent (embossed on metal label), kept legible at all times, and shall contain the fire resistance rating in hours and/or minutes.

1.7 QUALITY ASSURANCE

A. Single-Source Responsibility: Obtain access doors for entire project from one source from a single manufacturer.

B. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units, which may vary slightly from sizes indicated.

C. Coordination: Furnish inserts and anchoring devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

1.8 PROJECT CONDITIONS

A. Coordinate the work with other work requiring access doors.

B. Verification: Obtain specific locations and sizes for required access doors from trades requiring access to concealed equipment, and indicate on submittal schedule.

C. Special-Size Access Doors: Use where required or requested; indicate on schedule.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Access Doors:

1. Acudor Products Inc: www.acudor.com.
2. Bar-Co., Inc.
3. Cesco Products
4. J.L. Industries
5. Karp Associates, Inc: www.karpinc.com.
6. Larsens Manufacturing Co.
7. Milcor Inc: www.milcorinc.com.
8. The Williams Brothers Corp.
9. Substitutions: See Section 016001 - Product Requirements.

2.2 ACCESS DOORS AND PANELS

C. All Units: Factory fabricated, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assembly' units are to be installed in.

D. Units in Fire Rated Assemblies: Fire rating equivalent to the fire rated assembly in which they are to be installed.

2.3 ACCESS DOOR UNITS - WALLS AND CEILINGS

A. Door and Frame Units: Formed steel.

1. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.

2. Frames and flanges: 0.058 inch steel.

   a. Fabricate frame with exposed flange, nominal 1-inch wide around perimeter of frame for units installed in the following construction:

      1) Exposed masonry.

      2) Exposed concrete.

      3) Exposed siding.

   b. For gypsum drywall or gypsum veneer plaster, furnish perforated flange frames with drywall bead.

   c. For full-bed plaster and E.I.F.S. applications, furnish frames with galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.

3. Door panels: 0.070 inch single thickness steel sheet.

   a. Painted Flush Panel Doors (non-fire-rated and fire-rated): Fabricate from not less than 16-gage galvanized sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees. Finish with manufacturer's factory-applied prime paint.

      1) Restore any damage to galvanized finish with cold-process galvanizing repair paint, prior to applying factory prime coating, or other finishes.

      2) Attic Access Doors: Equivalent to Model FD Ceiling Access Door, as manufactured by J.L. Industries, Inc., by one of the above named manufacturers.

         (a) Size: As indicated on the Drawings; however, minimum opening size shall be 36-inches (hinged side) x 22-inches.

         (b) Provide up-opening equivalent model at any ships ladders.

(c) Provide equivalent non-fire-rated ceiling access door, where fire rating is not indicated.

(d) Provide hot-dipped galvanized access doors with factory primed baked enamel finish at exterior locations.

b. Stainless Steel Flush Panel Doors: Fabricate from not less than 18-gage stainless steel sheet, with concealed spring hinges or concealed piano hinge set to open 175 degrees. Buff exposed surfaces to #4 satin finish, except where other finishes are indicated.

4. Size: As indicated or as necessary to access and service equipment.

5. Hardware:

a. Hinge: 175 degree steel piano hinge with removable pin.

b. Lock: Screw driver slot for quarter turn cam lock.

6. Galvanized, hot dipped finish, except where indicated otherwise.

7. Finish: No. 4 finish for stainless units.

B. Non-Fire Rated Door and Frame Units in Walls:

1. Provide manufacturer's standard flush panel/door and frame.

C. Fire Rated Door and Frame Units in Walls:

1. For fire rated units, provide manufacturer's standard insulated flush panel/doors, with continuous piano hinge and self-closing mechanism.

D. Finishes:

1. Exterior: 3-coat 70% resin "Kynar 500" finish (i.e.: 7-mil prime coat, 9-mil color coat, and 9-mil clear top coat) to match exterior window finishes, unless otherwise selected by Architect from manufacturer's standard non-metallic colors - 12 colors minimum to select from, including white.

a. Soffit Locations: Color to match soffit material color selection, unless otherwise selected by Architect.

2. Interior, Exposed to Normal View: To match finish on interior "Finish Hardware"; Refer to Section 08710.

3. Interior, in Service Areas, Above Ceilings, etc: Factory primed baked enamel.

4. Toilet Rooms, Janitors Rooms, Kitchens, Kitchen Areas, Rooms Where Food is Stored, Prepared, Cooked and/or Served, and Break Rooms: Stainless steel, No. 4, satin finish.

2.4 FABRICATION

A. Weld, fill, and grind joints to ensure flush and square unit.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.2 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings. Secure rigidly in place.

C. Position units to provide convenient access to the concealed work requiring access.

D. Coordinate installation with work of other trades.

E. Prepare perimeter of rough openings in concrete, CMU, and clay masonry with mortar/grout full-depth of wall and to size required; use pressure-treated wood as necessary for other concealed blocking, grounds, and supports at any stud wall construction.

3.3 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08 31 13

SECTION 08 43 13

ALUMINUM FRAMED STOREFRONTS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Infill panels of glass.

C. Exterior aluminum doors and frames.

D. Perimeter sealant.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Steel attachment devices.

B. Section 07 90 00 - Joint Protection: Perimeter sealant and back-up materials.

C. Section 08 11 16 - Aluminum Doors and Frames

D. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.

E. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; American Architectural Manufacturers Association; 2004.

B. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; American Architectural Manufacturers Association; 2003 (part of AAMA 501).

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; American Architectural Manufacturers Association; 2009.

D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2005.

E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; American Society of Civil Engineers; 2005.

F. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.

G. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2007.

H. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.

I. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.

J. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.5 SUBMITTALS

A. See Division 1 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, dimensional limitations.

E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

F. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass, glazing materials.

G. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

H. Report of field testing for water leakage.

I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in state in which project is located.

B. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum five years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

A. See Division 1 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide (20) twenty year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:

1. EFCO Corporation;
2. Kawneer North America: www.kawneer.com.
3. United States Aluminum Corp: www.usalum.com.
4. Vistawall Architectural Products: www.vistawall.com.
5. YKK AP America, Inc.: www.ykkap.com.
6. Coral Architectural Products: www.coralap.com
7. Substitutions: See Division 1 - Product Requirements.

2.2 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.

1. Glazing Position: Front-set. [verify]
2. Water Leakage Test Pressure Differential: 2.86 lbf/sq ft.
3. Air Infiltration Test Pressure Differential: 1.57 psf.
4. Condensation Resistance Factor: 40 minimum
5. Outside glazed.
6. Finish: Superior performance organic coating.
7. Color: As selected from manufacturer's standards.

B. Performance Requirements:

1. Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E 330, using loads 1.5 times the design wind loads and 10 second duration of maximum load.

a. Design Wind Loads: Comply with requirements of ASCE 7.

b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

2. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.

3. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at specified differential pressure across assembly in accordance with ASTM E 283.

4. Condensation Resistance Factor: Measure in accordance with AAMA 1503 with 1 inch insulating glass installed.

5. Water Leakage: None, when measured in accordance with ASTM E 331 at specified pressure differential.

6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

2.3 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

1. Framing members for interior applications need not be thermally broken.

2. Glazing stops: Flush.

3. Cross-Section: 2-1/4 inch x 5 inch nominal dimension, outside-glazed, front plane, for exterior; 1-3/4 inch x 4 inch nominal dimension, center plane for interior applications. [verify dimensions]

4. Where aluminum door frames are scheduled, provide frames for interior doors only.

B. Doors: Glazed aluminum. [verify rail dimensions below]

1. Thickness: 1-3/4 inches.

2. Top Rail: 5 inches wide.
3. Vertical Stiles: 5 inches wide, minimum.
4. Bottom Rail: 6-1/2 inches wide, minimum.
5. Glazing Stops: Square.
6. Finish: Same as storefront.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B 221 (ASTM B 221M).
B. Fasteners: Stainless steel.
C. Perimeter Sealant: Type specified in Division 7.
D. Glass: As specified in Division 8
E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
F. Glazing Accessories: As specified in Division 8.

2.5 FINISHES

A. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as scheduled. 70% PVDF. Extent: All exterior and interior storefront.

2.6 HARDWARE

A. Door Hardware: Storefront manufacturer's standard type to suit application.
   1. Include for each door: continuous hinge and weather-stripping.
B. Balance of Door Hardware: As specified in Section 08 71 00.

2.7 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
C. Prepare components to receive anchor devices. Fabricate anchors.

D. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

E. Arrange fasteners and attachments to conceal from view.

F. Reinforce components internally for door hardware.

G. Increase gauge or reinforce framing members as required for imposed loads and span conditions.

H. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Coordinate attachment and seal of perimeter air and vapor barrier materials.

I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

J. Install hardware using templates provided.

1. See Section 08710 for hardware installation requirements.

K. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

L. Install perimeter sealant in accordance with Section 07900.

M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2.

3.05 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage during subsequent construction.

END OF SECTION 08 43 13

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SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 – GENERAL

1.1 Summary

A. Section Includes: Architectural Aluminum Curtain Wall Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of curtain wall framing.

B. Related Sections:

1. Division 08 43 13 "Aluminum-Framed Storefronts"

2. Division 08 71 00 "Door Hardware"

3. Division 08 80 00 "Glazing"

1.2 System Description

A. Curtain Wall System Performance Requirements:

1. Wind loads: Refer to Structural drawings for requirements and applicable Codes

2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 (0.3 l/s · m2) at a static air pressure differential of 6.24 psf (300 Pa).

3. Water Resistance, (static): The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.

4. Water Resistance, (dynamic): The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 12 psf (575 Pa) as defined in AAMA 501.

5. Uniform Load: A static air design load of 40 psf (1915 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.

6. Seismic: When tested to AAMA 501.4, system must meet design displacement of 0.010 x the story height and ultimate displacement of 1.5 x the design displacement.

7. Thermal Transmittance (U-factor): Per AAMA Specification 1503

8. Condensation Resistance (CRF): Per AAMA Specification 1503

9. Sound Transmission Loss: When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than:

STC 31 or OITC 26 based upon 1" insulating glass (1/4", 1/2" AS, 1/4"),

STC 37 or OITC 30 based upon 1" laminated glass (1/4" laminated, 1/2" AS, 1/4" laminated).

1.3 Submittals

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Quality Assurance/Control Submittals:

1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

1.4 Warranty [verify warranty lengths]

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for curtain wall system as follows:

1. Limited Product Warranty Period: Two (2) years from Date of Substantial Completion of the project.

2. Finish Warranty period: Provide finish with minimum Ten (10) years warranty period for color steadfastness, shading, and chalking.

1.5 Quality Assurance

A. Qualifications:

1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.

2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements. Manufacturer's Representative to be in attendance at pre-installation meeting.

C. Quality Assurance: Contractor to provide a mock-up to demonstrate supports, frames, flashing, caulking, and trim. Provide sample windows for mock-ups as shown in the Drawings.

1.6 Delivery, Storage, and Handling

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle material and components to avoid damage. Protect curtain wall material against damage from elements, construction activities, and other hazards before, during and after curtain wall installation.

PART 2 – PRODUCTS

2.1 Manufacturers (Acceptable Manufacturers/Products)

A. Acceptable Manufacturers: [verify model numbers & info in red]

1. Kawneer

   a. Series 2250 LR Wall System 1, 2-1/4"x 5" frame [Basis-of-Design], Front set, outside glazed pressure plate format

2. YKK AP America,

3. Vistawall,

4. Coral Architectural Products – PW251 Series

5. Tubelite Inc. – 200 Series or approved equal

B. Substitutions:

1. General: Refer to Substitutions Section for procedures and submission requirements.

   a. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.

2. Substitution Documentation

   a. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.

   b. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for curtain wall system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum curtain wall for a period of not less than ten (10) years. (Company Name)

   c. Test Reports: Submit test reports verifying compliance with each test requirement for curtain wall required by the project.

   d. Product Sample and Finish: Submit product sample, representative of curtain wall for the project, with specified finish and color.

3. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

2.2 Materials

A. Aluminum (Curtain Wall and Components):

1. Material Standard: Extruded Aluminum, ASTM B 221, 6063-T6 alloy and temper.

2. Member Wall Thickness: Each framing member shall have a wall thickness sufficient to meet the specified structural requirements.

3. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of curtain wall members are nominal and in compliance with AA Aluminum Standards and Data.

2.3 Accessories

A. Fasteners: Where exposed, shall be Stainless Steel.

B. Gaskets: Glazing gaskets shall comply with ASTM C 864 and be extruded of a silicone compatible EPDM rubber that provides for silicone adhesion.

C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Thermal Barrier: Thermal separator shall be extruded of a silicone compatible elastomer that provides for silicone adhesion.

2.4 Related Materials

A. Sealants: Refer to Joint Treatment (Sealants) Section.

B. Glass: Refer to Glass and Glazing Section.

2.5 Fabrication

A. General:

1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.

2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.

3. Prepare components to receive anchor devices. Fabricate anchors.

4. Arrange fasteners and attachments to conceal from view.

2.6 Finishes

A. Shop Finishing:

1. Color: To be selected from Manufacturers Full color range

2.7 Source Quality Control

A. Source Quality: Provide aluminum curtain walls specified herein from a single source.

1. Building Enclosure System: When aluminum curtain wall are part of a building enclosure system, including entrances, entrance hardware, windows, storefront framing and related products, provide building enclosure system products from a single source manufacturer.

PART 3 – EXECUTION

3.1 Examination

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.

1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.2 Installation

A. General: Install curtain wall systems plumb, level, and true to line, without warp or rack of frames with manufacturer's prescribed tolerances and installation instructions. Provide support and anchor in place.

1. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.

2. Glazing: Glass shall be outside glazed and held in place with extruded aluminum pressure plates anchored to the mullion using stainless steel fasteners spaced no greater than 9" on center.

3. Water Drainage: Each light of glass shall be compartmentalized using joint plugs and silicone sealant to divert water to the horizontal weep locations. Weep holes shall be located in the horizontal pressure plates and covers to divert water to the exterior of the building.

B. Related Products Installation Requirements:

1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.

2. Glass: Refer to Glass and Glazing Section.

   a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual

3.3 Field Quality Control

A. Field Tests: Architect shall select curtain wall units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.

   1. Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.

      a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft2, whichever is greater.

      b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 8 psf (383 Pa).

B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 Protection and Cleaning

A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum curtain wall system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

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SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 06 Section "Rough Carpentry".
2. Division 06 Section "Finish Carpentry".
3. Division 08 Section "Operations and Maintenance".
4. Division 08 Section "Door Schedule".
5. Division 08 Section "Hollow Metal Doors and Frames".
6. Division 08 Section "Flush Wood Doors".
7. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
8. Division 08 Section "Automatic Door Operators".
9. Division 28 Section "Access Control Hardware Devices".

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.

8. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

   a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
   b. Complete (risers, point-to-point) access control system block wiring diagrams.
   c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Automatic Operator Supplier Qualifications: Power operator products and accessories are required to be supplied and installed through the Norton Preferred Installer (NPI) program. Suppliers are to be factory trained, certified, and a direct purchaser of the specified power operators and be responsible for the installation and maintenance of the units and accessories indicated for the Project.

F. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

G. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run

concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Please note that ASSA ABLOY is transitioning the Yale Commercial brand to ASSA ABLOY ACCENTRA. This affects only the brand name; the products and product numbers will remain unchanged. The brand transition is expected to be complete in or about May of 2024, and products shipping after that time will be branded ASSA ABLOY ACCENTRA.

D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
   b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Manufacturers:

   a. Hager Companies (HA) - BB Series, 5-knuckle.
   b. McKinney (MK) - TA/T4A Series, 5-knuckle.
   c. dormakaba Best (ST) - F/FBB Series, 5-knuckle.

2.3 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

a. Hager Companies (HA).
b. Pemko (PE).
c. Dormakaba Best (ST).

2.4 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

a. Hager Companies (HA) - ETW-QC (# wires) Option.
b. McKinney (MK) - QC (# wires) Option.
c. Dormakaba Best (ST) - C Option.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Manufacturers:

a. Pemko (PE) - SER-QC (# wires) Option.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:

a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
b. McKinney (MK) - Connector Hand Tool: QC-R003.

2. Manufacturers:

a. McKinney (MK) - QC-C Series.

b. Dormakaba Best (ST) - WH Series.

2.5 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

   a. Door Controls International (DC).
   b. Rockwood (RO).
   c. Trimco (TC).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:

   a. Hiawatha, Inc. (HI).
   b. Rockwood (RO).
   c. Trimco (TC).

2.6 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Manufacturer's Standard.

C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
2. Manufacturers:

   a. ASSA ABLOY ACCENTRA, formerly known as Yale (YA) - Keymark.
   b. Corbin Russwin (RU) - Access 3 AP.
   c. Sargent (SA) - Degree DG1.

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

G. Construction Keying: Provide construction master keyed cylinders.

H. Construction Keying: Provide temporary keyed construction cores.

I. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.7 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.8 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

a. ASSA ABLOY ACCENTRA, formerly known as Yale (YA) - 5400LN Series.
b. Corbin Russwin Hardware (RU) - CLX3300 Series.
c. Sargent Manufacturing (SA) - 10X Line.

2.1 INTEGRATED WIRED OUTPUT LOCKING DEVICES - MULTI-CLASS READER

A. Integrated Wired Output Multi-Class Mortise Locks: Wiegand or Open Supervised Device Protocol (OSDP) output ANSI A156.13, Grade 1, mortise lockset with integrated card reader with or without keypad option, request-to-exit signaling, door position status switch, and latchbolt monitoring in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Latchbolt monitoring and door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
2. Integrated reader supports the following credentials:

a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.

b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart)
d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant
e. NFC-enabled mobile phones
f. PIN code only or PIN + credential with keypad option.

3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
4. Energy Efficient Design: Provide lock bodies which have a holding current draw of 500mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
5. Support end-of-line resistors contained within the lock case.
6. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
7. Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
8. Manufacturers:

a. Sargent Manufacturing (SA) - SN200/SN210 8200 Series.

B. Integrated Wired Output Multi-Class Cylindrical Locks: Wiegand or Open Supervised Device Protocol (OSDP) output ANSI A156.2, Grade 1, Cylindrical Lockset with integrated card reader with or without keypad option, and request-to-exit signaling in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Inside lever handle (request-to-exit) signaling standard with door position (open/closed status) monitoring (via separately connected DPS).
2. Integrated reader supports the following credentials:

a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart)
d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant
e. NFC-enabled mobile phones
f. PIN code only or PIN + credential with keypad option

3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
4. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
5. Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
6. Manufacturers:

    a. Sargent Manufacturing (SA) - SN200/SN210 10 Line.

2.2 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Manufacturers:

    a. ASSA ABLOY ACCENTRA, formerly known as Yale (YA) - 350 Series.
    b. Corbin Russwin Hardware (RU) - DL4000 Series.
    c. Sargent Manufacturing (SA) - 4870 Series.

2.3 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.4 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide exit devices with functions and features as follows:

    a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
    b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
    c. No catch points: addition of applied deflectors or other added components are not allowed.
    d. No visible plastic.
    e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
    f. Constructed of all stainless steel.

g. Stainless steel pullman type latch with deadlock feature.
h. Narrow or wide style exterior trim as specified in the hardware sets.
i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
j. Ten-year limited warranty for mechanical features.

2. Manufacturers:

a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.
b. Sargent Manufacturing (SA) - PE80 Series.

C. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical exit devices shall have the following functions and features:

a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
e. Five-year limited warranty for electromechanical features.

2. Manufacturers:

a. ASSA ABLOY ACCENTRA, formerly known as Yale (YA) - 7000 Series.
b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
c. Sargent Manufacturing (SA) - 80 Series.

2.5 INTEGRATED WIRED OUTPUT EXIT DEVICES - MULTI-CLASS READER

A. Integrated Wired Output Multi-Class Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated card reader with or without keypad option, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).

2. Integrated reader supports the following credentials:

    a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
    b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
    c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart)
    d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant
    e. NFC-enabled mobile phones
    f. PIN code only or PIN + credential with keypad option

3. 12VDC external power supply required for reader. 24VDC required for solenoid operated exit trim. Fail safe or fail secure options.
4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
5. Competitor Alternates Allowed Option: Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
6. Manufacturers:

    a. Sargent Manufacturing (SA) - SN200/SN210 80 Series.

2.6 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:

   a. ASSA ABLOY ACCENTRA, formerly known as Yale (YA) - 4400 Series.
   b. Corbin Russwin Hardware (RU) - DC6000 Series.
   c. Norton Rixson (NO) - 7500 Series.
   d. Sargent Manufacturing (SA) - 351 Series.

2.7 ELECTROMECHANICAL DOOR OPERATORS

A. Electromechanical Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that are UL325/991 and UL10C certified and comply with requirements for the Americans with Disabilities Act (ADA). Operators shall accommodate openings up to 250 pounds and 48" wide.

1. Provide operators with features as follows:

   a. Non-handed with push and pull side mounting.
   b. Activation by push button, hands-free or radio frequency devices.
   c. Adjustable opening force and closing power.
   d. Two-year limited warranty.
   e. Wi-Fi interface.
   f. Mounting backplate to simplify and speed up installation.
   g. Integration with access control systems.

2. Operators shall have the following functionality:

   a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
   b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
   c. Emergency Interface Relay: Door closes and ignores any activation input until signal is discontinued.
   d. Infinite Hold Open: Door will hold open at set position until power is turned off.
   e. Latch Assist: At closed position, after an activation, the door is pulled in. After the door has closed, the door is pulled in to assist with latch release/engagement.

f. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
g. Open Delay: Delays operator opening for locking hardware.
h. Outside Wall Switch Disable: When contact is closed, outside wall switch is disabled.
i. Power Assist: Senses the door is being opened manually and applies small amount of power to assist the user in opening the door with force less than 5 lbs. The door opens only as far as it is moved manually, then closes once released.
j. Power Close: Additional force to assist door closing between 7° and 2°.
k. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
l. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
m. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
n. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.
o. Executive Mode Feature: When the door receives an activation signal it opens and remains open until either a second signal is received, or the door is manually moved in closing direction.

3. Manufacturers:

a. Norton Rixson (NO) - 6300 Series.

2.8 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood (RO).
    c. Trimco (TC).

2.9 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

    a. Hiawatha, Inc. (HI).
    b. Rockwood (RO).
    c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

    a. Norton Rixson (RF).
    b. Rockwood (RO).
    c. Sargent Manufacturing (SA).

2.10 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. National Guard Products (NG).
2. Pemko (PE).
3. Reese Enterprises, Inc. (RE).

2.11 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Securitron (SU) - DPS Series.

B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

2. Manufacturers:

a. Securitron (SU) - AQL Series.

2.12 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.13 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Power Operator products and accessories are required to be installed through current members of the manufacturer's "Power Operator Preferred Installer" program.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood

4. SA - SARGENT
5. RF - Rixson
6. NO - Norton
7. OT - Other
8. SU - Securitron

Hardware Sets

Set: 1.0

Doors: 100, 100A (Openings to be supplied in Section 087113.50)

Set: 2.0

Doors: C1-1, C1-4
Description: EXT PR - ALUM - CORRIDOR [AUTO OPERATOR]

2	Continuous Hinge	CFM_SLF-HD1 SER		PE	⚡
1	Concealed Vert Rod Exit, Exit Only	55 56 AD8410 EO	US32D	SA	⚡
1	Concealed Vert Rod Exit, Nightlatch	55 56 64 AD8410 106	US32D	SA	⚡
1	Core	DG1 6300	US15	SA	
2	Pull	RM4402LH/RH	US32D	RO	
2	Automatic Opener	6300 series	689	NO	⚡
1	Perimeter Seals	By Door / Frame Manufacturer		OT	
2	Sweep	3452CNB x Length Required		PE	
1	Threshold	2005AV MSES25SS x Length Required		PE	
1	ElectroLynx Harness	QC-C1500P		MK	⚡
1	ElectroLynx Harness	QC-C0**P		MK	⚡
1	Card Reader	Provided By Security Supplier		OT	
2	Position Switch	DPS - M / W-BK		SU	⚡
1	Switch Post	500	689	NO	⚡
1	Door Switch	505		NO	⚡
1	Power Supply	AQL series		SU	⚡

Notes: Operational Narrative:
1. Doors normally closed and secure.
2. Exit device latches can be electrically held retracted for open access.
3. ADA access by actuator switch. In locked condition, actuator energized only upon valid card reader presentation.
4. Egress free for immediate exit. ADA egress by actuator switch.

5. REX switch in push rail allows authorized exit without alarm condition.
6. Door position switches monitor open/closed status.
7. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 3.0

Doors: C1-3A
Description: EXT SGL - CORRIDOR [ACCESS CONTROL]

2	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Electric Hinge, Hvy Wt	T4A3386-QC* 4-1/2" x 4-1/2"	US32D	MK ⚡
1	Rim Exit Device	64 SN200-PE8876 BIKS-03 NEL	US32D	SA ⚡
1	Core	DG1 6300	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Gasketing	303AV x Length Required		PE
1	Rain Guard	346C x Width of Frame Head		PE
1	Sweep	3452CNB x Length Required		PE
1	Threshold	2005AV MSES25SS x Length Required		PE
1	ElectroLynx Harness	QC-C1500P		MK ⚡
1	ElectroLynx Harness	QC-C0**P		MK ⚡
1	Position Switch	DPS - M / W-BK		SU ⚡
1	Power Supply	AQL series		SU ⚡

Notes: Operation:
1. Door normally closed, locked, latched and locked. Access by valid credential or key override. In the event of power failure door locks.
2. Free egress at all times.

Set: 4.0

Doors: 102A
Description: EXT SGL - MEETING ROOM [EXIT ONLY]

3	Hinge, Full Mortise	TA2314 NRP 4-1/2" x 4-1/2"	US32D	MK
1	Rim Exit Device, Exit Only	PE8810 EO	US32D	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Gasketing	303AV x Length Required		PE
1	Rain Guard	346C x Width of Frame Head		PE
1	Sweep	3452CNB x Length Required		PE

1	Threshold	2005AV MSES25SS x Length Required		PE	
1	Position Switch	DPS - M / W-BK		SU	⚡

Set: 5.0

Doors: 100B
Description: PR - LOBBY [AUTO OPERATOR]

4	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	
2	Electric Hinge	TA2714-QC* 4-1/2" x 4-1/2"	US26D	MK	⚡
2	Surface Vert Rod Exit, Exit Only	55 56 NBPE8710 EO	US32D	SA	⚡
2	Pull	RM4402LH/RH	US32D	RO	
2	Automatic Opener	6300 series	689	NO	⚡
1	Perimeter Seals	By Door / Frame Manufacturer		OT	
2	Position Switch	DPS - M / W-BK		SU	⚡
2	Door Switch	505		NO	⚡

Notes: Operational Narrative:
1. Doors normally closed and secure.
2. Exit device latches can be electrically held retracted for open access.
3. ADA access by actuator switch. In locked condition, actuator energized only upon valid card reader presentation.
4. Egress free for immediate exit. ADA egress by actuator switch.
5. REX switch in push rail allows authorized exit without alarm condition.
6. Door position switches monitor open/closed status.
7. Exit device latches release (fail secure) in event of power loss. Keyed cylinder override for emergency access.

Set: 6.0

Doors: 209
Description: PR - READING ROOM

6	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
4	Pull	RM4402LH/RH Mtg-Type 11XHD	US32D	RO
2	Drop Plate / Spacer	as required	EN	SA
2	Surface Closer	TB 351 PS	EN	SA
1	Perimeter Seals	By Door / Frame Manufacturer		OT

Set: 7.0

Doors: 102
Description: PR - MEETING ROOM

6	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Flush Bolt	555 / 557 (As Required)	US26D	RO
1	Mortise Deadlock	64 4875	US26D	SA
1	Core	DG1 6300	US15	SA
4	Pull	RM4402LH/RH Mtg-Type 11XHD	US32D	RO
2	Surface Closer	TB 351 PS	EN	SA
2	Silencer	608-RKW		RO

Set: 8.0

Doors: 103, 212
Description: SGL - HISTORY, CONFERENE [ACCESS CONTROL]

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	
3	Electric Hinge	TA2714-QC* 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Access Control Cyl Lock	64 SN200-10XG271-24V BIKS-03 LL	US26D	SA	⚡
1	Core	DG1 6300	US15	SA	
1	Surface Closer	TB 351 UO	EN	SA	
1	Wall Stop	409 or 446 as required	US32D	RO	
1	Perimeter Seals	By Door / Frame Manufacturer		OT	
1	ElectroLynx Harness	QC-C1500P		MK	⚡
1	ElectroLynx Harness	QC-C0**P		MK	⚡
1	Position Switch	DPS - M / W-BK		SU	⚡
1	Power Supply	AQL series		SU	⚡

Notes: Operation:
1. Door normally closed, locked, latched and locked. Access by valid credential or key override. In the event of power failure door locks.
2. Free egress at all times.

Set: 9.0

Doors: 216
Description: SGL - MULTI-PURPOSE [ACCESS CONTROL]

2	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	
1	Electric Hinge	TA2714-QC* 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Access Control Cyl Lock	64 SN200-10XG271-24V BIKS-03 LL	US26D	SA	⚡
1	Core	DG1 6300	US15	SA	
1	Surface Closer	TB 351 PS	EN	SA	
1	Perimeter Seals	By Door / Frame Manufacturer		OT	

1	ElectroLynx Harness	QC-C1500P	MK	⚡
1	ElectroLynx Harness	QC-C0**P	MK	⚡
1	Position Switch	DPS - M / W-BK	SU	⚡
1	Power Supply	AQL series	SU	⚡

Notes: Operation:
1. Door normally closed, locked, latched and locked. Access by valid credential or key override. In the event of power failure door locks.
2. Free egress at all times.

Set: 10.0

Doors: C1-3
Description: SGL - OPEN WORK ROOM [ACCESS CONTROL]

2	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	
1	Electric Hinge	TA2714-QC* 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Access Control Cyl Lock	64 SN200-10XG271-24V BIKS-03 LL	US26D	SA	⚡
1	Core	DG1 6300	US15	SA	
1	Surface Closer	TB 351 PS	EN	SA	
3	Silencer	608-RKW		RO	
1	ElectroLynx Harness	QC-C1500P		MK	⚡
1	ElectroLynx Harness	QC-C0**P		MK	⚡
1	Position Switch	DPS - M / W-BK		SU	⚡
1	Power Supply	AQL series		SU	⚡

Notes: Operation:
1. Door normally closed, locked, latched and locked. Access by valid credential or key override. In the event of power failure door locks.
2. Free egress at all times.

Set: 11.0

Doors: 101
Description: SGL - VENDING

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Mortise Deadlock	64 4875	US26D	SA
1	Core	DG1 6300	US15	SA
2	Pull	RM4402LH/RH	US32D	RO
1	Drop Plate / Spacer	as required	EN	SA

1 Surface Closer	TB 351 PS	EN	SA
1 Perimeter Seals	By Door / Frame Manufacturer		OT

Set: 12.0

Doors: 210
Description: SGL - STORE

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Mortise Deadlock	64 4875	US26D	SA
1 Core	DG1 6300	US15	SA
2 Pull	RM4402LH/RH	US32D	RO
1 Drop Plate / Spacer	as required	EN	SA
1 Surface Closer	TB 351 UO	EN	SA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	409 or 446 as required	US32D	RO
1 Perimeter Seals	By Door / Frame Manufacturer		OT

Set: 13.0

Doors: 206A, 206B, 206C
Description: SGL - STUDY

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Mortise Deadlock	64 4875	US26D	SA
1 Core	DG1 6300	US15	SA
2 Pull	RM4402LH/RH	US32D	RO
1 Drop Plate / Spacer	as required	EN	SA
1 Surface Closer	TB 351 UO	EN	SA
1 Wall Stop	409 or 446 as required	US32D	RO
1 Perimeter Seals	By Door / Frame Manufacturer		OT

Set: 14.0

Doors: 104, 109, 109A, 112
Description: SGL - STORE, STUDY, SERVING KITCHEN

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Classroom Lock	64 10XG37 LL	US26D	SA
1 Core	DG1 6300	US15	SA
1 Surface Closer	TB 351 UO	EN	SA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	409 or 446 as required	US32D	RO
1 Perimeter Seals	By Door / Frame Manufacturer		OT

Set: 15.0

Doors: 113
Description: PR - STORAGE

6 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Dust Proof Strike	570	US26D	RO
2 Flush Bolt	555 / 557 (As Required)	US26D	RO
1 Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1 Core	DG1 6300	US15	SA
2 Wall Stop	409 or 446 as required	US32D	RO
2 Silencer	608-RKW		RO

Set: 16.0

Doors: 111, 216A
Description: SGL - ELEC, STORAGE

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1 Core	DG1 6300	US15	SA
1 Wall Stop	409 or 446 as required	US32D	RO
1 Silencer	608-RKW		RO

Set: 17.0

Doors: 107
Description: SGL - OPEN WORK ROOM

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1 Core	DG1 6300	US15	SA
1 Surface Closer	TB 351 UO	EN	SA
1 Wall Stop	409 or 446 as required	US32D	RO
3 Silencer	608-RKW		RO

Set: 18.0

Doors: 115, 210A, 212A
Description: SGL - MEP, STORAGE

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1 Core	DG1 6300	US15	SA

1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Wall Stop	409 or 446 as required	US32D	RO
3 Silencer	608-RKW		RO

Set: 19.0

Doors: 105
Description: SGL - JAN

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1 Core	DG1 6300	US15	SA
1 Surface Closer	TB 351 PS	EN	SA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Mop Plate	K1050 4" high CSK BEV	US32D	RO
3 Silencer	608-RKW		RO

Set: 20.0

Doors: 106, 108, 114
Description: SGL - OFFICE

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Entry/Office Lock	64 10XG05 LL	US26D	SA
1 Core	DG1 6300	US15	SA
1 Wall Stop	409 or 446 as required	US32D	RO
1 Silencer	608-RKW		RO

Set: 21.0

Doors: 110, 214
Description: SGL - TOILET [OHS]

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Privacy Lock	10XU65 LL	US26D	SA
1 Surf Overhead Stop	10-X36	630	RF
1 Silencer	608-RKW		RO
1 Coat Hook	RM801	US26D	RO

Set: 22.0

Doors: 202A, 202B
Description: SGL - RESTROOM

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Pull Plate	107x70C	US32D	RO
1	Push Plate	70C-RKW	US32D	RO
1	Surface Closer	TB 351 UO	EN	SA
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Mop Plate	K1050 4" high CSK BEV	US32D	RO
1	Wall Stop	409 or 446 as required	US32D	RO
3	Silencer	608-RKW		RO

END OF SECTION 08 71 00

SECTION 08 71 13

AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following types of automatic door operators:
   1. Low energy and power assist door operators for swinging doors.

B. Related Sections:
   1. Division 7 Sections for caulking to the extent not specified in this section.
   2. Division 8 Section "Aluminum-Framed Entrances and Storefronts" for entrances furnished separately in Division 8 Section.
   3. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.
   4. Division 26 and 28 Sections for electrical connections including conduit and wiring for automatic entrance door operators and access control devices.

1.2 REFERENCES

A. References: Refer to the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.

B. American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA).
   1. ANSI/BHMA A156.10 American National Standard for Power Operated Pedestrian Doors.
   2. ANSI/BHMA A156.19 Standards for Power Assist and Low Energy Power Operated Doors.

C. Underwriters Laboratories (UL).
   1. UL Listed R-9469 Fire Door Operator with Automatic Closer.
   2. UL10C – Positive Pressure Fire Tests of Door Assemblies.
   3. UL 325 Standard for Safety for Door, Drapery, Gate, Louver and Window Operators and Systems.
   4. UL991 Listed - Tests for Safety-Related Controls Employing Solid-State Device.
   5. UL244A – Solid – State Controls for Appliances.

6. UL1998 – Software in Programmable Components.
7. UL1310 – Class 2 Power Units.

D. American Association of Automatic Door Manufacturers (AAADM).

E. American Society for Testing and Materials (ASTM).
1. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
2. ASTM B209 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.

F. American Architectural Manufacturers Association (AAMA).
1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.

G. National Association of Architectural Metal Manufacturers (NAAMM).
1. Metal Finishes Manual for Architectural Metal Products.

H. International Code Council (ICC).
1. IBC: International Building Code.

1.3 DEFINITIONS

A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to activate the operation of the door.
1. Knowing act: Consciously initiating the opening of a power operated door using acceptable methods including wall mounted switches such as push plates and controlled access devices such as keypads, card readers and key switches.

B. Safety Device: A device that detects the presence of an object or person within a zone where contact could occur and provides a signal to stop the movement of the door.

1.4 PERFORMANCE REQUIREMENTS

A. Automatic door equipment accommodates medium to heavy pedestrian traffic.

B. Opening Force Requirements: Doors shall open with a manual force, not to exceed 30lbf (133N) to set the door in motion and 15 lbf to fully open the door applied at 1" (25 mm) from the latch edge of the door. The force required to prevent a stopped door from opening or closing shall not exceed 15 lbf (67 N) measured 1" (25 mm) from the latch edge of the door at any point during opening or closing.

C. Closing Time:
1. Doors shall be field adjustable to close from 90 degrees to 10 degrees in 3 seconds or longer as applicable per ANSI/BHMA A156.19 standards.

2. Doors shall be field adjusted to close from 10 degrees to fully closed in not less than 1.5 seconds.

1.5 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, fabrication, operational descriptions and finishes.

B. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections and details, indicating dimensions, materials, operator, motion /presence sensor control device, anchors, hardware, finish, options and accessories.
   1. Indicate required clearances, and location and size of each field connection.
   2. Indicate locations and elevations of entrances showing activation and safety devices.
   3. Wiring Diagrams: For power, signal, and activation / safety device wiring.

C. Samples: Submit manufacturer's samples of aluminum finish.

D. Manufacturers Field Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA after completion of installation.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the work of this section in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the operators and their nearest service representatives. The final copies delivered after completion of the installation test to include spare parts list.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.6 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 10 years of documented experience in manufacturing of doors and equipment of similar to that indicated for this Project and that have a proven record of successful in-service performance. Manufacturer to have a company certificate issued by AAADM.

B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Certified Inspector Qualifications: Certified by AAADM.

D. Source Limitations for Automatic Door Operators: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.

E. Certifications: Operators shall be certified by the manufacturer to meet performance design criteria in accordance with the following standards.
   1. ANSI/BHMA A156.19 American National Standard for Power Assist and Low Energy Operated Doors.
   2. NFPA 101 - Life Safety Code.

F. Emergency Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrance doors serving as a required means of egress.

1.7 COORDINATION

A. Coordinate door operators with doors, frames and related work to ensure proper size, thickness, hand, function and finish. Coordinate hardware for automatic entrances with hardware required for rest of the project.

B. Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to power supplies and access control system as applicable.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Automatic Door Operators shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.

C. During the warranty period a factory-trained technician shall perform service and affect repairs. An inspection shall be performed after each adjustment or repair.

D. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal business hours.

E. Manufacturer shall have in place a dispatch procedure that shall be available 24 hours a Day, 7 Days a week for emergency call back service.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: ASSA ABLOY Entrance Systems, 1900 Airport Road, Monroe, NC 28110. Toll Free (877) SPEC-123. Fax (704) 290- 5555 Website www.assaabloyentrance.com contact: specdesk.na.aaes@assaabloy.com

Project Local Contact

Buddy Baker
205-258-6125; buddy.baker@assaabloy.com

B. Substitutions: Requests for substitution and product approval in compliance with the specifications must be submitted in writing and in accordance with the procedures outlined in Division 1, Section "Substitution Procedures". Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, as indicated below:
   1. Extruded Aluminum, Alloy 6063-T5.

2.3 SWING DOOR OPERATORS

A. Model: Besam ASSA ABLOY SW200i automatic door operator (Basis of Design):
   1. Reference Standard: ANSI/BHMA A156.19.
   2. Configuration: Operator to control single swinging doors and pairs of swinging doors as indicated on the drawings and specified below:
      a. Traffic Pattern: Two way.
      b. Pairs of Doors: Single leaf operation.
   3. Automatic Door Operator: Electro-mechanical, non-handed operator, powered by 24 volt, 1/4 hp motor. Operator shall be adjustable to compensate for different manual push forces as required.
      a. Automatic operator shall be capable of operating and controlling up to a 700 pound (317.5 kg) door, 48 inches (1219 mm) in width.
      b. Surface Mounted:
         1) Side Access Operator Housing: Operator is contained in 5-1/8" (130.2 mm) deep x 4 5/16" (110 mm) high extruded aluminum housing with a removable cover.
         2) Surface Mounted Housing: Continuous for full width of door.
         3) Connecting Hardware: Surface mounted operators to have a steel arm from the operator, mounted to the top face of the swing door.
         4) UL Listed R-9469 Fire Door Operator with Automatic Closer (surface mounted operator).

c. Operator shall be field switchable between an ANSI/BHMA A156.19 and an ANSI/BHMA A156.10 compliant operator and vice versa. Addition of the required safety sensors, activation devices and guard rails may be required to comply with the applicable standard.
d. Operator Temperature Range: Capable of operating within temperature ranges of -31□ F to 160□ F (-35□ C to 71□ C).
e. Electrical Characteristics: Maximum power consumption is 300 watts (2.5 amps at 120 VAC), 50/60hz, built-in thermal overload protection.
f. Battery Convenience Mode: Operator to maintain continuous operation by battery power during power failure. Battery is continuously monitored and provides a warning signal if the battery is not working properly.

4. Door Operation:
   a. Opening Cycle The adjustable speed operator mechanically powers the drive shaft and the torque control maintains constant speed throughout the opening cycle regardless of stack pressures or wind speed. Operator shall allow manual door operation with operational forces as indicated to fully open the door applied at 1" (25 mm) from the latch edge of the door.
      1) Manual push force shall be adjustable from 5 lbf to 15 lbf maximum.
   b. Hold Open: The operator shall stop and hold the door open at the selected door opening angle for an adjustable period of time (1.5 seconds to 30 seconds).
   c. Closing Cycle: Spring close with speed controlled power assist.
      1) Upon loss of power, dynamic braking will control the door insuring controlled closing.
      2) Selectable Torque Control: Automatically adjusts torque without changing the closing speed of the operator.
         a) When the torque control is activated, the closing speed shall remain constant regardless of stack pressures or wind speed.
         b) Torque Cancellation: The torque control is deactivated whenever there is a signal received from door mounted sensors.
         c) The torque control is disabled during manual use of the door.
   d. Wind Force Dampening: The operator electromechanically counteracts wind forces, slowing down the door movement to safely open or close the door.
   e. Stack Pressure Compensation: Operator shall counteract positive stack pressures, negative stack pressures, and sudden changes of stack pressures. The operator never allows the door to open or close faster than the speed control settings, regardless of pressures.
   f. Obstruction Control: The operator will stop and reverse the door movement.
   g. Electric Lock Management:

1) Internal module for electrified locking integration.
2) Electric Lock Output: Selectable 12 VDC, maximum 1200 mA / 24 VDC, maximum 600 mA.
3) Lock monitoring prevents operator(s) from opening door(s) until release of electrified lock.
4) Operator pulls door closed before opening, automatically unjamming electric latch hardware.
5) Sequenced operation between operators for pairs of doors allowing lock release and astragal coordination.

h. Lock Retry Circuit: If attempt to fully close the door is unsuccessful, the operator will automatically reverse open 10 degrees and reclose in an attempt to successfully close the door.

i. Selectable Alarm Reset: The operator can be field set so that after receiving an alarm signal, the operator will not accept any activation impulses and will operate only as a manual door closer until manually reset.

j. Electronic Controls: Solid state integrated circuit controls the operation and switching of the swing power operator. The electronic control provides low voltage power supply for all means of actuation. The controls include time delay (1 to 30 seconds) for normal cycle.

k. Control Switch: Automatic door operators shall be equipped with the following type of multi-position function switch:
   1) Three position rocker switch mounted on end cap (On-Off-Hold).

5. Operator Interface:
   a. Safety Sensor Integration for overhead presence safety device and door mounted reactivation safety sensors.

2.4 ACTIVATION DEVICES

A. General: Provide activation devices in accordance with ANSI/BHMA standards, for condition of exposure and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.

B. Knowing Act Activation Device:
   1. Sensor Plate: Jamb mounted touchless, 2-3/4 inch x 4-1/2 inch wave plates and 4-1/2 inch square activation senor plates, black polycarbonate with white letters. Microwave technology has an adjustable range of 2 inches to 24 inches.
      a. Exterior Door #100 AND #100A: Wikk Bollard with touchless wave plate to enter and jamb mounted touchless wave plate to exit.
      b. Interior Doors #100B: Jamb mounted touchless wave plates both sides.

2.5 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Automatic Door Operator Enclosure:
   1. Anodized Finish:
      a. AAMA 611, Clear, AA- M12C22A41, Class I, 0.018 mm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance of swinging power operated doors.

B. Examine roughing-in for electrical source power to verify actual locations of wiring connections.

C. Proceed only after such discrepancies or conflicts have been resolved.

3.2 INSTALLATION

A. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.

B. Operators: Install automatic door operators plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
   1. Install surface mounted hardware using concealed fasteners to greatest extent possible.
   2. Set headers, carrier assemblies, tracks, operating brackets and guides level and true to location with anchorage for permanent support.

C. Door Operators: Connect door operators to electrical power distribution system including smoke evacuation system and/or fire detection system as specified in Division 26 Sections.

D. Sealants: Comply with requirements specified in division 7 Section “Joint Sealants” to seal between the operator housing and the adjacent surfaces.

E. Signage: Apply signage on both sides of each door and sidelite as required by ANSI/BHMA A156.10 and manufacturers installation instructions.

F. Signage: Apply signage on both sides of each door and sidelite as required by ANSI/BHMA A156.19 and manufacturers installation instructions.

3.3 ADJUSTING

A. Adjust automatic door operators, controls and hardware for smooth and safe operation and for weather tight closure. Adjust doors in compliance with ANSI/BHMA standard.

3.4 FIELD QUALITY CONTROL

A. Before placing doors into operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA standard. Certified technician shall be approved by manufacturer.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by automatic door operator installation.

B. Clean metal surfaces promptly after installation. Remove excess sealants, compounds, dirt and other substances. Repair damages and finish to match original finish.

3.6 DEMONSTRATION

A. Engage a factory-authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of the door.

END OF SECTION

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SECTION 08 80 00

GLAZING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames

B. Section 08 14 16 - Flush Wood Doors

C. Section 08 43 13 - Aluminum-Framed Storefronts

D. Section 08 44 13 - Glazed Aluminum Curtain Walls

E. Section 10 28 00 - Toilet, Bath, & Laundry Accessories: Mirrors.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.

D. ASTM C 1036 - Standard Specification for Flat Glass; 2006.

E. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.

F. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2009.

G. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2007.

H. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2008.

I. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.

J. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

1.4 SUBMITTALS

A. See Division 1 - Submittal Procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Certificates: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Labeling: Furnish each pane of fire resistance-rated glazing and each pane of safety glazing with a permanent identification which meets the requirements of the latest approved edition of the International Building Code.

B. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual", and SIGMA TM-3000, "Vertical Glazing Guidelines", except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

C. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

D. Fire Resistance Rated Glass: Provide glass products that meet CPSC 16 CFR 1201, Category I or II requirements for fire-rated and impact-resistant glass and are labeled and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

E. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component pane of units with appropriate certification label of the inspecting and testing organization indicated below.

1. Insulating Glass Certification Council (IGCC).

a. Certification: CBA.

F. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.

G. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.6 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 50 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WARRANTY

A. See Section 01 77 00 - Closeout Procedures, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

C. Laminated Glass: Provide a five (5) year warranty to include coverage for delamination, including replacement of failed units.

D. Replacements Under Warranties: Provide same warranty as original glass and glazing, beginning from date of replacement completion for glass units replaced under Warranty provisions.

PART 2 – PRODUCTS

2.1 GLAZING TYPES

A. IG-1 Insulating Coated Vision Glass:

1. Basis of Design: 1" SNX 62/27 Insulating Coated Glass as manufactured by Guardian

a. Exterior Glass Ply: ¼" Clear, HS Glass

b. Coating: Guardian Crystal Gray – Clear, low e on #2 surface

c. Airspace: ½" Black finish

d. Silicone: Black

e. Interior Glass Ply: ¼" Clear, HS Glass

2. Performance Requirements

a. Visible Light Transmission: 44%

b. Exterior Reflectance: 8%

c. Winter U Value: .29

d. Solar Heat Gain Coefficient: .22

e. Relative Heat Gain: 54

B. IG-2 Insulating Coated Vision Glass with Acid Etched #3 surface:

1. Basis of Design: 1" SNX 62/27 Insulating Coated Glass as manufactured by Guardian

a. Exterior Glass Ply: ¼" Clear, HS Glass

f. Coating: Guardian Crystal Gray – Clear, low e on #2 surface

g. Airspace: ½" Black finish

h. Silicone: Black

i. Interior Glass Ply: ¼" Clear, HS Glass with acid etch on #3 surface

2. Performance Requirements

a. Visible Light Transmission: 44%

b. Exterior Reflectance: 8%

c. Winter U Value: .29

d. Solar Heat Gain Coefficient: .22

e. Relative Heat Gain: 54

C. IGS-1 Insulating Coated Spandrel Glass

1. Basis of Design: 1" SNX 62/27 Insulating Coated Glass as manufactured by Guardian

a. Exterior Glass Ply: ¼" Clear, HS Glass

b. Coating: Guardian Crystal Gray – Clear, low e on #2 surface

c. Airspace: ½" Black finish

d. Silicone: Black

e. Interior Glass Ply: ¼" Clear, HS Glass with Warm Gray Spandrel #4

2. Performance Requirements

a. Winter U Value: .29

D. IGS1-- Single Exterior Vision Glazing: Safety glazing.

1. Applications: Exterior glazing not indicated to be Insulating Glass Units, but required to be safety glazed.

2. Type: Fully tempered float glass.

3. Tint: Tinted to match other exterior vision glazing.

4. Thickness: 1/4 inch.

5. Glazing Method: Gasket glazing.

E. Type S-1 - Single Vision Glazing:

1. Applications: All interior glazing unless otherwise indicated.

2. Type: Annealed float glass.

3. Tint: Clear.

4. Thickness: 1/4 inch.

5. Glazing Method: Gasket glazing.

F. Type S-2 - Fire-Rated Safety Glazing:

1. Applications: Provide this type of glazing in the following locations:

a. Glazed lites in fire doors.

b. Fire windows.

c. Sidelights, borrow lites, and other glazed openings in partitions indicated as having an hourly fire rating.

d. Other locations indicated on the drawings.

2. Fire Rating: As indicated on the drawings.

3. Type: Glass-ceramic safety glazing.
4. Thickness: 1/4 inch.
5. Glazing Method: As required for fire rating.

G. Type S-3 - Single Safety Glazing: Non-fire-rated.

1. Applications: Provide this type of glazing in the following locations:
   a. Glazed lites in doors, except fire doors.
   b. Glazed sidelights to doors, except in fire-rated walls and partitions.
   c. Other locations required by applicable federal, state, and local codes and regulations.
   d. Other locations indicated on the drawings.

H. Type: Fully tempered float glass as specified.

1. Tint: Clear.
2. Thickness: 1/4 inch.
3. Glazing Method: Gasket glazing.

I. Type S-4 - Single Safety Glazing: Non-fire-rated.

1. Applications: Provide this type of glazing in the following locations:
   a. Where translucent glass is indicated on door types
   b. Other locations indicated on the drawings.
2. Type: Fully tempered float glass as specified.
3. Tint: Translucent, 100% coverage
4. Thickness: 1/4 inch.
5. Glazing Method: Gasket glazing.

2.2 EXTERIOR GLAZING ASSEMBLIES

A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7.

1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.

2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.

3. Thicknesses listed are minimum.

2.3 GLASS MATERIALS

A. Float Glass Manufacturers:

1. AGC Flat Glass North America, Inc: www.afgglass.com.

2. Guardian Industries Corp: www.sunguardglass.com.

3. Pilkington North America Inc: www.pilkington.com.

4. PPG Industries, Inc: www.ppg.com.

5. Substitutions: Refer to Section 01 60 00 - Product Requirements

B. Float Glass: All glazing is to be float glass unless otherwise indicated.

1. Annealed Type: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).

2. Heat-Strengthened and Fully Tempered Types: ASTM C 1048.

3. Tinted Types: Color and performance characteristics as indicated.

4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

C. High Impact-Resistant Tempered Safety Glazing: Complying with 16 CFR 1201 test requirements for Category II.

D. Glass-Ceramic Safety Glazing: UL- or WH-listed as fire-protection-rated glazing and complying with 16 CFR 1201 test requirements for Category II without the use of a surface-applied film.

2.4 SEALED INSULATING GLASS UNITS

A. Manufacturers:

1. Guardian

2. Vitro

3. PPG

4. Any of the manufacturers specified for float glass.

5. Any fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty, if any.

6. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Sealed Insulating Glass Units: Types as indicated.

1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.

2. Edge Spacers: Aluminum, bent and soldered corners.

3. Edge Seal: Glass to elastomer with supplementary silicone sealant.

4. Purge interpane space with dry hermetic air.

2.5 GLAZING COMPOUNDS

A. Manufacturers:

6. Bostik Inc: www.bostik-us.com.

7. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.

8. Pecora Corporation: www.pecora.com.

9. BASF Construction Chemicals-Building Systems: www.chemrex.com.

10. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.

C. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.

D. Acrylic Sealant: Single component, solvent curing, non-bleeding; ASTM C 920, Type S, Grade NS, Class 12-1/2, Uses M and A; cured Shore A hardness of 15 to 25; color as selected.

E. Polysulfide Sealant: Two component; chemical curing, non-sagging type; ASTM C 920, Type M, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25; black color.

F. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; Shore A Hardness Range 20 to 35; color as selected.

2.6 GLAZING ACCESSORIES

A. Setting Blocks: Silicone, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self-adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; color as selected.

E. Glazing Clips: Manufacturer's standard type.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.

E. Install sealant in accordance with manufacturer's instructions.

3.3 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.4 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

E. Trim protruding tape edge.

3.5 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.

G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION - EXTERIOR BUTT GLAZED METHOD (SEALANT ONLY)

A. Temporarily brace glass in position for duration of glazing process. Mask edges of glass at adjoining glass edges and between glass edges and framing members.

B. Temporarily secure a small diameter non-adhering foamed rod on back side of joint.

C. Apply sealant to open side of joint in continuous operation; thoroughly fill the joint without displacing the foam rod. Tool the sealant surface smooth to concave profile.

D. Permit sealant to cure then remove foam backer rod. Apply sealant to opposite side, tool smooth to concave profile.

E. Remove masking tape.

3.7 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.

D. Place glazing tape on free perimeter of glazing in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.8 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.

B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.

F. Trim protruding tape edge.

3.9 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)

A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.

B. Locate and secure glazing pane using glazers' clips.

C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.10 MANUFACTURER'S FIELD SERVICES

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.

B. Monitor and report installation procedures and unacceptable conditions.

3.11 CLEANING

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

3.12 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION 08 80 00

SECTION 08 90 00

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

B. See Section 08 11 13 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.

C. See Section 08 14 16 "Flush Wood Doors" for louvers in flush wood doors.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.

1. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft. (1436 Pa) acting inward or outward.

C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

C. Samples: For each type of metal finish required.

D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Fasteners: Use types and sizes to suit unit installation conditions.

1. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.

2. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.

3. For fastening stainless steel, use 300 series stainless-steel fasteners.

4. For color-finished louvers, use fasteners with heads that match color of louvers.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

A. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

B. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal Storm-Resistant Louver (LV-1):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Ruskin Company, Tomkins PLC; EME520DD Wind-Driven Rain Resistant Stationary Louver or comparable product by one of the following:

   a. Construction Specialties, Inc.

   b. Nystrom Building Products.

   c. Reliable Products, Inc.

2. Louver Depth: 5 inches (125 mm).

3. Frame and Blade Nominal Thickness: Not less than 0.063 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.

4. Louver Performance Ratings:

   a. Free Area: Not less than 3.0 sq. ft. for 24-inch-wide by 60-inch- high louver.

   b. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph (13 m/s) at a core-area intake velocity of 500 fpm (2.5 m/s).

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.

C. Louver Screening:

1. Bird Screening: Flattened, expanded aluminum, 5/8 by 0.040 inch thick.

2.5 ALUMINUM FINISHES

A. Kynar 500 Fluoropolymer Coating:

1. Conform to AAMA 605.2.

2. Apply coating following cleaning and pretreatment.
3. Cleaning: AA-C12C42R1X.
4. Dry louvers before final finish application.
5. Total Dry Film Thickness: Approximately 1.2 mils, when baked at 450 degrees F for 10 minutes.
6. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory and refinish entire unit or provide new units.

D. Protect galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

END OF SECTION 08 90 00

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

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

B. Related work specified elsewhere includes:

1. Section 05 40 00 - "Cold-Formed Metal Framing"
2. Section 06 10 00- "Rough Carpentry" (grounds and concealed P.T.blocking)
3. Section 07 21 00 - "Thermal Insulation" (thermal insulation and sound batts)
4. Section 07 80 00 - "Fire and Smoke Protection"
5. Section 07 62 00 - "Sheet Metal Flashing and Trim"
6. Section 07 90 00 - "Joint Protection"
7. Division 09 90 00 - "Paintings & Coatings"

1.2 DESCRIPTION OF WORK:

A. Work described in this section includes the following types of gypsum board construction:

1. Steel framing members to receive gypsum board.
2. Gypsum board screw-attached to steel framing and furring members,and to wood framing, where indicated.

3. Grid type suspension systems for sloped and horizontal ceiling applicationsof interior gypsum board products which are not attached directly to primary framing system (if any).
4. Gypsum sheathing, with air infiltration barrier (felt) and building wrap, orwaterproofing underlayment, as indicated.
5. Notes:
   a. Extend framing and gypsum board up at fire-rated walls to bottom offire-rated enclosures above (where occurs) or to roof or floor deck, and mud top edges.
   b. Extend non-rated walls up to bottom of structure.
   c. Extend only that partition framing specifically indicated as not full-height up to finished ceilings and tie-off every 4th stud to structure above.
   d. Completed work in repair and renovation work shall be flush with andto match finish texture to immediately adjacent materials and work.
6. Refer to Division 07 21 00 - "Thermal Insulation," for thermal insulation and any "sound batts".

1.3 DEFINITIONS:

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

1.4 SUBMITTALS:

A. Submit the following according to Conditions of the Contract and Division 1 Specifications Sections.
   1. Current product data and installation instructions from manufacturers for each type of product specified; Six (6) Sets - minimum.
   2. Evaluation Reports: Submit evaluation reports certified under an independent third-party inspection program administered by an agency accredited by IAS to ICC-ES AC98 accreditation criteria for inspection

agencies, from ICC-ES, or other qualified testing agency acceptable to authorities having jurisdiction".

1.5 QUALITY ASSURANCE:

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel Framing Industry Association (SFIA) or similar organization providing a verifiable code-compliance program.

B. Fire-Resistance Ratings:

1. Where indicated, provide materials and construction which are identical with those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

2. Provide fire-resistance rated assemblies identical to those indicated by reference to GA File numbers in GA-600 "Fire Resistance Design Manual"

or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction.

C. Single Source Responsibility: Obtain all steel framing and all metal trim from a single manufacturer, and each type of gypsum board and related joint treatment materials from a single manufacturer.

D. Pre-Construction Conference: Prior to beginning work associated with roof system, the Contractor and appropriate subcontractors shall meet to discuss coordination of the work of the trades associated with the installation of the roof system, suspended acoustical and gypsum board ceiling, suspended mechanical ductwork, suspended light fixtures, etc. This work shall be planned and coordinated to provide hanger attachments needed by the various trades in a manner that will minimize conflict with installation of the roof system.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202.

B. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

C. Store materials inside, under cover, and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

D. When materials are moved into the building, distribute pallets and loads evenly around work areas so as to avoid overloading structure, causing damage to any materials, interfering with work of other trades, etc.

E. Handle gypsum boards to prevent damage to edges, ends and surfaces. Donot bend or otherwise damage metal corner beads, trim, etc.

F. Refer to Division 1 Sections "Summary of Work" and "Special Conditions" for additional information and requirements regarding stored materials.

1.7 PROJECT CONDITIONS:

A. Environmental Requirements, General: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C840, with gypsum board manufacturer's recommendations, and with adhesive manufacturer's recommendations, for before, during, and after installation.

B. Minimum Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg. F.

C. Ventilate building spaces to remove water not required for drying jointtreatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

1.8 SEQUENCING AND SCHEDULING:

A. Sequence installation of gypsum board and sheathing with installation of exterior cladding and roofing to comply with requirements indicated below:

1. Do not leave gypsum sheathing board exposed to weather after its application for more than one month or, if protected as indicated below, for more than 6 months:

a. Cover exterior surface of sheathing with a temporary air infiltration barrier equivalent to 6-mil polyethylene film. Apply covering immediately after sheathing is installed.

b. Remove covering just prior to installation of asphalt felt, face brick,and similarly applied exterior materials.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:

1. Steel Framing and Furring:

a. ClarkDietrich

b. Marino/WARE Industries, Corp.

c. SEMCO, Southeastern Metals, Div. of Gibraltar Industries

d. Steel-Con; Div. of Steel Construction Systems

e. Telling Industries, LLC

2. Grid or Direct Suspension Systems:

a. CertainTeed

b. Armstrong World Industries, Inc.

c. Chicago Metallic Corp.

d. USG Interiors, Inc.; United States Gypsum Company Worthington Industries, Inc.

3. Gypsum Board and Related Products:

a. ClarkDietrich

b. CertainTeed

c. Georgia-Pacific Corp.

d. Gold Bond Building Products Div., National Gypsum Company

e. Lafarge Gypsum

f. United States Gypsum Company

4. Extruded Moldings and Reveal Moldings:

a. AMICO

b. Fry Reglet Corporation

c. Gordan, Inc.

d. M&M Systems Corporation

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS:

A. General: Provide components which comply with AISI S220 and ASTM C645, Section 10 for materials and sizes, unless otherwise indicated.

B. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40 (Z120); or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
   1. Product: Subject to compliance with requirements, provide ClarkDietrich; DiamondPlus Coating on ProSTUD and ProTRAK [25] [20].

C. Wires for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Steel Studs for Furring Channels: AISI S220 and ASTM C645, Section 10 , with flange edges bent back 90deg. and doubled over to form 3/16-inch minimum lip (return), minimum thickness of base steel metal and minimum depth as follows:

1. Thickness: 20 gauge, unless otherwise indicated.

2. Depth: As indicated.

3. Spacing: As indicated in referenced standard and on drawings, but no less than at all edges and 24-inches o.c.

F. Steel Rigid Furring Channels:AISI S220 and ASTM C645, Section 10, hat-shaped, depth of 7/8-inch, andminimum thickness of base steel metal as follows:

1. Thickness: 20 gauge at interior and 18-gauge at exterior, unless otherwise indicated.

2. Spacing: As indicated in referenced standard and on drawings, but not less than at all edges and 24-inches o.c.

a. At ceilings and soffits indicated to receive more than a single layer of gypsum board, spacing shall be not less than at all edges and 16-inches o.c.

G. Grid Suspension System: ASTM C 645, manufacturer's standard grid suspension system composed of main beams and cross furring members which interlock to form a modular supporting network.

1. Locations for Use: Provide grid type suspension systems for sloped and horizontal ceiling applications of interior gypsum board products which are not attached directly to primary framing system; Minimum 4-feet x 4-feet grid and cross tees at 2-feet o. c., with minimum installation requirements as required by manufacturer's current written instructions, referenced standards, and as indicated in this section and Division 9. Provide and comply with manufacturer's published requirements for accessories, trim, and hanger wire, and as otherwise required to provide flat ceilings without deflection or sag.

2. Product/Manufacturer: Provide suspended modular grid furring system equivalent to standard drywall suspension system for flat ceilings, with 1-1/2-inch grid faces, and as follows:

a. Equivalent to "Drywall Suspension System", as manufactured by USG Interiors, or one of the other above named manufacturers.

2.3 STEEL FRAMING FOR WALLS AND PARTITIONS:

A. Steel Studs and Runners:

1. AISI S220 and ASTM C645, Section 10 , with flange edges bent back 90 deg. and doubled over to form 3/16-inch minimum lip (return), and

complying with the following

requirements for minimum thickness of base steel metal and minimum depth as follows:

2. Metal studs at interior partitions shall be 3-5/8-inches x 20 gauge (362SI 62-33), 6-inches x 20 gauge (600SI 62-33), or 8-inches x 18 gauge (800SI 62-43), at locations indicated on the Drawings, spaced at 16-inches o.c., unless otherwise indicated below, or otherwise shown on drawings or required by project conditions. Stud depth shall be -1 1/4 inches unless otherwise indicated.

3. Use double studs or 6-inch studs, as indicated or as otherwise required, forchase walls, piping, conduits, or etc.

   a. Metal studs at shaft wall or similar construction shall be type, thickness, depth and configuration indicted, or if not indicated, not less than the studs used in the tested assembly. Minimum thickness of 3-5/8-inch studs shall be 20 gauge, and of 6-inch studs shall be 20 gauge.

4. Special stud tracks for all curved walls shall be equivalent to "Flex-C Trac" galvanized flexible segmented track with slidable side straps, as manufactured by Flex-Ability Concepts, Inc.; Edmond, OK; Phone: (405) 302-0611 or 360TRAK by ClarkDietrich..

5. Any interior load-bearing studs, if any, shall be at least 6-inches depth x 18 gauge (600SI 62-43), or 8-inches x 18 gauge (800SI 62-43), unless otherwise indicated on Drawings - galvanized C-studs spaced at 16-inches o.c.

B. Track:

1. Bottom Track: Unless otherwise indicated or required by project conditions, fire-ratings, etc., provide manufacturer's standard Deep Leg Tracks, unpunched unless otherwise indicated, of size, shape and gauge indicated, with 1 ¼ -inch flange.

2. Deflection Track - Typical at Stud Walls Up To Slab or Similar Fixed Structure at Top of Walls: Provide for no less than 1" of vertical movement, Equivalent to one of the following:

a. ClarkDietrich; MaxTrak

b. ClarkDietrich TR-Series with Spazzer 9200 Bar (SPZD)

3. Firestop Track: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

   a. [**BlazeFrame DL**] [**BlazeFrame DSL**] [**BlazeFrame RipTRAK**] [**UltraBEAD with UltraTRAK Slotted System**] [**UltraBEAD with Deep Leg Deflection Track].**

4. Special stud tracks for all curved walls shall be equivalent to "Flex-C Trac" galvanized flexible segmented track with slidable side straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK; Phone: (405) 996-5343 Or 360TRAK by ClarkDietrich..

5. Special stud tracks for all arched walls shall be equivalent to "Flex-C Arch" galvanized flexible segmented track with slidable straps, as manufactured by Flex-Ability Concepts, Inc.; Oklahoma City, OK; Phone: (405) 996-5343.

C. Fasteners: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing andfurring members securely to substrates involved; complying with the recommendations of gypsum drywall manufacturers for applications indicated.

D. Continuous Horizontal Bridging/ Bracing:

1. 1-1 /2-inch cold-rolled channels (galvanized).

2. Spacing: 4'-0" or 4'-6" o.c. vertically, through pre-punched slots in studs.

3. Splice Plates: 16 gauge at all splices.

4. Anchors (bridging channels to studs): 1-1 /2-inches x 2-inches x 16 gauge clip angle, 1 /4-inch less than stud width, secured with four (4) 5/8-inch S-14 screws. (Anchors required at ends of runs, where snap-in fit to stud slots is not snug or allows stud to move/slide on channels, and at studs on each side of splices in bridging channels).

E. Strap Bracing: 1-1 /2-inch x 20-gauge galvanized steel, anchored at

ends, splices, and each stud with typical framing screws. Placement at curvedwalls shall align with radius or curve indicated at each such location.

F. Extruded Moldings and Reveal Moldings: Provide manufacturer's standard alloy 6063-T5 extruded units with 70% resin 2-coat "Kynar 500" baked enamel finish, and as follows:

1. Design: Provide shapes and configurations as indicated on the Drawings.

   a. Form reveal moldings to cover at least two sides and rear of reveal.

   b. At drywall (or plaster) edge, provide continuous expanded metaledge, designed for mudding-in.

   c. At ceiling grid edge, provide continuous edge designed forcompatibility with lay-in ceiling grid.

2. Color: To match ceiling grid in same room where occurs, unless indicated otherwise, and color as selected by Architect at any exterior locations.

2.4 GYPSUM BOARD:

A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end joints.

B. Gypsum Wallboard: ASTM-C1396, and as follows:

1. Type: Type X at all locations; High Impact Resistant where exposed to view in the finished work and in Gymnasiums and related athletic areas, except Standard Type X at walls, ceilings and furr-downs over 4'-0" abovefinished floor.

2. Edges: Tapered and featured (rounded or beveled) for prefilling.

3. Thickness: 5/8-inch for general use, except where 1 /4-inch layers (at least two layers) may be indicated or required for curved wall or ceiling assemblies.

C. Gypsum Backing Board for Multi-Layer Applications: where backing board is not available from manufacturer, gypsum wallboard, ASTM-C1396 , and as follows:

1. Type: Type X at all locations.

2. Edges: Manufacturer's standard.

3. Thickness: 5/8-inch.

D. Moisture-, Mold- and Mildew- Resistant Gypsum Board: ASTM-C1396, and as follows:

1. Type: Type X at all locations; Moisture-, mold- and mildew- resistant core and facings/surfaces; High Impact Resistant where exposed to view in the finished work and in Gymnasiums and related athletic areas, except Standard Type X at walls, ceilings and furr-downs over 4'-0" above finishedfloor.

2. Edges: Manufacturer's standard.

3. Thickness: 5/8-inch.

4. Locations: At rooms with toilet fixtures and/or service sinks, entire wall behind sinks, and elsewhere only as indicated.

5. Use 5/8-inch thick equivalent to Georgia-Pacific "Dens-Shield" tile backer board with sealed and facing-taped joints, at ceramic and hard tile; ASTM C 1177 or ASTM C 1178.

6. Use "exterior gypsum board" where exposed at any exterior locations; ASTM C 1396.

7. Old style "Green Board" WILL NOT BE ACCEPTABLE FOR ANY USE.

E. Gypsum Sheathing Board with Water-Resistant Core: Gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, water-repellent surfaced on face, back and long edges;complying with and requirements indicated below:

1. Type: Type X at all locations.

2. Edge and End Configuration: Square.

3. Thickness: 5/8-inch, unless indicated otherwise on the Drawings.

4. Size: 4'-0" x 8'-0" or 9'-0" as required for coordination with framing.

5. Note: Use one of the following, 5/8-inch thick, with sealed and facing-taped joints at any exterior stud walls and exterior stud framing, only where plywood or other wood sheathing is not indicated.

   a. CertainTeed "GlasRoc Sheathing"

   b. Georgia-Pacific "Dens-Glass Gold"

   c. Gold Bond "e2XP"

   d. Lafarge Weather Defense Platinum

   e. USG "Securock"

6. Cover ALL SHEATHING with air infiltration barrier (felt) and building wrap, or waterproofing underlayment where specified in Division 7 Section "Flashing and Sheet Metal".

2.5 TRIM ACCESSORIES:

A. Cornerbead and Edge Trim for Interior Installation: Provide corner beads, edge trim and control joints which comply with ASTM C 1047 and requirements indicated below:

   1. Material: Formed metal, plastic, or metal combined with paper, with metal complying with the following requirement.

      a. Sheet steel coated with zinc by hot-dip, orwith aluminum.

   2. Edge trim shapes indicated below by reference to designations of Fig. 1 in ASTM C 1047:

      a. "LC" Bead, unless otherwise indicated.

      b. "L" Bead where indicated or required.

      c. "U" Bead where indicated.

   3. One-Piece Control Joint: Formed with vee-shaped slot per Fig. 1 in ASTM C 1047, with slot opening covered with removable strip.

2.6 GYPSUM BOARD JOINT TREATMENT MATERIALS:

A. General: Provide materials complying with ASTM C 475, ASTM C 840, andrecommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

B. Joint Tape: Paper reinforcing tape.

C. Drying-Type Joint Compounds:

1. Factory-prepackaged vinyl-based products complying with the followingrequirements for formulation and intended use.

2. Ready-Mix Formulation: Factory-premixed product.

3. Taping compound formulated for embedding tape and for first coat overfasteners and flanges of corner beads and edge trim.

4. Topping compound formulated for fill (second) and finish (third) coats.

5. All-purpose compound for use as both taping and topping compound.

D. Setting-Type Joint Compound:

1. Factory-prepackaged, job-mixed, chemical-hardening powder products formulated for uses indicated.

2. For filling joints and treating fasteners of water-resistant gypsum backingboard behind base for ceramic tile, use formulation recommended by gypsum board manufacturer for this purpose.

2.8 MISCELLANEOUS MATERIALS:

A. General: Provide auxiliary materials for gypsum drywall construction which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.

B. Spot Grout: ASTM C 475, setting-type joint compound of type recommended for spot grouting hollow metal door frames.

C. Fasteners: Type S steel drill screws, 1-inch long unless otherwise required for shaft wall or multi-layer application, with corrosion-resistant finish in form of cadmium plating or proprietary coating, and as follows:

1. For attachment of gypsum board panels to light gauge steel framing of less than 0.033 of an inch in thickness (20 gauge), provide steel drill screwscomplying with ASTM C 1002.

2. For attachment of gypsum board panels, including sheathing, to steel framing from 0.033 (20 gauge) to 0.112 of an inch in thickness, provide steel drill screws complying with ASTM C 954.

D. Air Infiltration Barrier: Asphalt-saturated organic felt complying with ASTM D226, Type 1 (No. 15 asphalt felt), unperforated; unless indicated otherwise.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates to which drywall construction attaches or abuts, presethollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION FOR METAL SUPPORT SYSTEMS:

A. Ceiling Anchorages:

1. Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure that inserts and other structural anchorage provisions have been installed to receive ceiling anchors in a manner that will develop their full strength and at spacing required to support ceiling.

3.3 INSTALLATION OF STEEL FRAMING, GENERAL:

A. Steel Framing Installation Standard: Install steel framing to comply with ASTMC 754 and with ASTM C 840 requirements that apply to framing installation.

B. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, cabinets, countertops, shelving, grab bars, toilet accessories, furnishings, and similar

construction to comply with details indicated and with recommendations ofgypsum board manufacturer, or if none available, with "Gypsum Construction Handbook" published by United States Gypsum Co.

1. Refer to Section 06 10 00 - "Rough Carpentry" for additional information and requirements.

2. Provide additional horizontal framing (flat studs or tracks) at 24-inches o.c. minimum in walls at cabinets and at ends of countertops, and as otherwise required, to assure square corners and flat walls without bowing, warping, etc.

C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at locations indicated below to complywith details shown on Drawings:

1. Where edges of suspended ceilings abut building structure horizontally at ceiling perimeters or penetration of structural elements.

2. Where partition and wall framing abuts overhead structure:

a. Provide slip or cushioned type joints as detailed to attain lateral support and avoid axial loading.

b. Unless framing is specifically indicated to terminate below ceilings, allframing and gypsum board shall extend up to bottom of structure above.

D. Do not bridge building expansion and control joints with steel framing or furring members; independently frame both sides of joints with framing or furring members or as indicated.

3.4 INSTALLATION OF STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS:

A. Suspend ceiling hangers from building 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 structural orceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers

   to support ceiling loads within performance limits established by referenced standards.

3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

5. Secure hangers to structural support by connecting directly to structure where possible; otherwise, connect to anchorage devices or fasteners as indicated or required.

6. Do not support ceilings directly from permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

7. Do not attach hangers to steel deck tabs.

8. Do not attach hangers to steel roof deck. Attach hangers to structuralmembers.

9. Do not connect or suspend steel framing from ducts, pipes or conduit.

10. Keep hangers and braces 2-inches clear of ducts, pipes and conduits.

11. Sway-brace suspended steel framing with hangers used for support.

12. Install suspended steel framing components in sizes and at spacing indicated but not less than that required by referenced steel framing installation standard.

13. Installation Tolerances: Install steel framing components for suspended ceilings so that cross furring members or grid suspension members are level to within 1 /8-inch in 12 ft. as measured both lengthwise on each member and transversely between parallel members.

14. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross furring members to each other and butt-cut to fit into wall track.

15. Suspension Systems:

    a. Suspend ceiling hangers from building structural members and asfollows below, with system leveling tolerance of 1 /8 inch in 12'-0".

    b. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structuralor ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

    c. Wire Hangers: 0.1620-inch diameter (8 gauge), 4-feet on center. Install supplementary hangers as necessary at ceiling fixtures to provide a hanger at each corner of each fixture, diffuser, grille, andother ceiling-mounted equipment.

    d. Where width of ducts and other construction within ceiling plenum produces hanger spacing's that interfere with the location of hangers at spacing's required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits indicated and as established by referenced standards.

    e. Secure wire hangers by looping and wire-tying, either directly to

structures or to inserts, eye screws, or other devices that are secureand appropriate for substrate, and in a manner that will not cause
them to deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

f. Secure, angle, and rod hangers, (if any) to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

g. Space hangers not more than 4'-0" o.c. along each member supported directly from hangers, unless otherwise shown, and provide hangers not more than 8 inches from ends of each member.

h. Provide additional hangers as necessary, so that one hanger occurs on each side of lay-in and surface-mounted light fixtures, and at othergrid supported equipment, devices, etc.

3.5 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS:

A. Install runners (tracks) at floors, ceilings and structural walls and columns,where gypsum drywall stud system abuts other construction

B. Installation Tolerances: Install each steel framing and furring member so thatfastening surface does not vary more than 1 /8-inch from plane of faces of adjacent framing.

C. Extend wall and partition framing full height to structural supports or substratesabove suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors andopenings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Provide studs up to tie to structure at 4'-0" o.c. minimum, from partitionsterminating below ceilings.

D. Install steel studs and furring in sizes and at spacing's, indicated but not less than that required by referenced steel framing installation standard.

E. Install steel studs so that flanges point in the same direction and gypsum boards can be installed in the direction opposite to that of the flange.

F. Install horizontal steel bridging/bracing in all walls, and the additional strap bracing at curved walls as steel framing progresses (refer to Paragraph 2.3 Cand D above). Install in compliance with stud manufacturer's recommendations, at spacing indicated.

1. Galvanized steel strap bracing shall be provided continuous at top andbottom runner tracks and at bridging locations at all curved stud walls.

G. Frame door openings to comply with details indicated, with GA-219 and withapplicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jambanchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

1. Extend vertical jamb studs (double studs-typical) through suspended ceilings and attach to underside of floor or roof structure above, unless otherwise indicated.

H. Frame openings other than door openings to comply with details indicated,or if none indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required for door heads.

3.6 APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:

A. Gypsum Board Application and Finishing Standard: Install and finish gypsum board to comply with ASTM C 840 and GA-216.

B. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24-inches in alternate courses of board.

C. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24- inches.

D. Install wall/partitions boards in manner which minimizes the number of end-butt joints or avoids them entirely where possible. At high walls, install

boards horizontally with end joints staggered over studs.

E. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1 /16-inch open space between boards.Do not force into place.

F. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut orfield-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

G. Attach gypsum board to steel studs so that leading edge or end of eachboard is attached to open (unsupported) edge of stud flange first.

H. Attach gypsum board to supplementary framing and blocking provided foradditional support at openings and cutouts.

I. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32-inches wide. Apply spot grout at each jamb anchor clip just before inserting board into frame.

J. Form control joints and expansion joints at locations indicated, with space between edges of boards, prepared to receive trim accessories.

1. Provide control joints in long partitions and walls at a maximum spacing of30 feet on center, unless a closer spacing is indicated. Provide control joints in large ceiling areas at a maximum spacing of 50 feet on center in each direction, unless a closer spacing is indicated. Consult with Architect on locations of all control joints prior to beginning work.

K. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, etc.), except inside double or chase wallswhich are required to be braced internally.

1. Except where concealed application is required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area, and may be limited to not less than 75% of full coverage.

2. Fit gypsum board around ducts, pipes, and conduits.

3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabsand decks, cut gypsum panels to fit profile formed by coffers, joists, andother structural members; allow 1 /4-to- l /2-inch-wide joints to install sealant.

4. Fire-stop around penetrations as required by Codes and authorities having jurisdiction. Refer to Section 07 80 00 for additional information and requirements.

L. Where interior partitions are indicated to extend to the structure above, thedrywall shall also extend to the structure with the same number of layers asrequired below the ceiling.

M. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1 /4-inch to 1 /2-inch space and trim edge with "U" bead edge trim. Seal joints with acoustical sealant.

N. At all interior walls, seal construction at perimeters, control and expansion joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above acoustical ceilings.

0. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

P. Install "sound batts" and insulation as the work progresses. Refer to Section 07 21 13 for additional information and requirements.

3.7 METHODS OF GYPSUM BOARD APPLICATION:

A. Single-layer Application: Install gypsum wallboard as follows:

1. On ceilings apply gypsum board prior to wall/partition board applicationto the greatest extent possible.

2. On partitions/walls apply gypsum board vertically (parallel to framing),unless otherwise indicated or required for fire or smoke

resistive rated assemblies. Provide maximum length panels, to minimize end joints.

3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally(perpendicular to framing); use maximum length sheets possible to minimize end joints.

B. Multi-Layer Application:

1. Install gypsum backing board for base layer and gypsum wallboard for face layer.

2. On ceilings apply base layer(s) prior to base layer application on walls/partitions; apply face layers in same sequence. Offset joints between layers at least 10-inches. Apply base layers at right angles to supports unless otherwise indicated.

3. On partitions/walls apply base layer(s) and face layers vertically (parallelto framing) with joints of base layers over supports and face layer joints offset at least one stud or furring member space from base layer joints.

C. Single-Layer Fastening Methods: Apply gypsum boards to supports as follows:

1. Fasten with screws.

D. Multi-Layer Fastening Methods:

1. Apply base layer(s) of gypsum board and face layer to base layer(s) asfollows:

2. Fasten both base layer(s) and face layer separately to supports with screws.

3.8 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

A. General: Where feasible, use the same fasteners to anchor trim accessoryflanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Install corner beads at external corners.

C. Install metal edge trim whenever edge of gypsum board would otherwise beexposed or semi-exposed, and except where plastic trim is indicated.

Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supportingsubstrate.

2. Install "L" bead where edge trim can only be installed after gypsum board is installed.

3. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

D. Install edge trim where indicated on wall panels at juncture with ceilings.

E. Install control joints at locations indicated, or if not indicated, at spacings and locations required by referenced gypsum board application and finish standard, and approved by the Architect for visual effect.

3.9 FINISHING OF DRYWALL:

A. General: Apply treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Prefill open joints and rounded or beveled edges, if any, using setting-typejoint compound.

C. Apply joint tape at joints between gypsum boards, except where trimaccessories are indicated.

D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:

1. Embedding and First Coat: Ready-mix drying-type all-purpose or taping compound.

2. Fill (Second) Coat: Ready-mix drying-type all-purpose or topping

compound.

3. Finish (Third) Coat: Ready-mix drying-type all-purpose or topping compound.

E. Partial Finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing, except where finishing is required to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.10 GYPSUM WALL SHEATHING:

A. General:

1. Comply with manufacturer's current written instructions, GA 252, and the following for the installation of gypsum sheathing.

2. Cut boards at penetrations, edges and other obstructions of the work; fit tight against abutting work, except provide 3/8-inch setback where non-loadbearing work abuts structural elements at head and jambs.

3. Coordinate installation of sheathing with installation of flashing and jointsealers so that these combined materials are installed in the sequence and manner which prevents exterior moisture from passing through complete exterior wall assembly to the interior.

4. Apply fasteners so that screw heads bear tightly against face of gypsum sheathing boards but do not cut into face paper.

5. Do not bridge building expansion joints with gypsum sheathing; cut and space edges to match spacing of structural support elements.

B. Vertical Installation: Install 4-feet wide gypsum sheathing boards vertically with vertical edges centered over flanges of steel studs. Abut ends and edges of each board with those of adjoining boards. Screw-attach boardsat perimeter and within field of board to each steel stud as follows:

1. Fasteners spaced approximately 8-inches o.c. and set back 3/8-inch minimum from edges and ends of boards.

C. Air Infiltration Barrier Application: Cover gypsum board sheathing with air infiltration barrier as follows:

1. Location: Apply self-adhered sheet membrane air barrier over gypsum sheathing occurring behind masonry veneer and waterproofing underlayment at metal siding.

2. Cut back air barrier 1 /2-inch on each side of break in supporting membersat control joint locations.

3.11 CLEANING AND PROTECTION OF WORK:

A. Promptly remove any joint compound and adhesives and similar residue from adjacent surfaces, as it may occur.

B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction remain without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 21 16

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain Tile.
2. Ceramic Tile.
3. Waterproof membrane for thinset applications.
4. Crack isolation membrane.

B. Related Requirements:

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.

1.2 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 its "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.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

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. Full-size units of each type of trim and accessory for each color and finish required.
3. Stone thresholds in 6-inch lengths.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of product.

C. Product Test Reports: For tile-setting and -grouting products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer's supervisor for Project holds the International Masonry Institute's Foreman Certification.
3. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

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 protected from freezing.

1.8 FIELD 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

B. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.
2. Crack isolation membrane.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics 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 TCNA 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.

2.3 TILE PRODUCTS

A. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute

B. Porcelain Tile Type PT-1: porcelain floor tile.

1. Dal Tile

a. Series: Diplomacy
b. Color: Light Grey DP01
c. Profile: 12x24
d. Installation: Stack Bond Pattern

2. Grout Color: Laticrete #78 Sterling Silverp

3. Trim Units:Use with Schluter DILEX-AHK where floor tile meets wall tile

C. Wall Tile Type CP T-1: Ceramic Wall Tile.

1. Tile Bar

a. Series: Artblock / Stacy Garcia
b. Color: Grigio / Glossy
c. Profile: 4x16
d. Installation: Horizontal Stack Bond

2. Grout Color: Laticrete: Color to be Determined

3. Trim Units:Use with Schluter Systems

a. External Corners: Schluter Rondec
b. Exposed Top of Tile: Schluter Rondec

D. Wall Tile Type CP T-2: Ceramic Wall Tile.

1. Tile Bar

a. Series: Artblock / Stacy Garcia

b. Color: Blanco / Glossy
c. Profile: 4x16
d. Installation: Horizontal Stack Bond

2. Grout Color: Laticrete: Color to be Determined

3. Trim Units:Use with Schluter Systems

a. External Corners: Schluter Rondec
b. Exposed Top of Tile: Schluter Rondec

2.4 WATERPROOF AND CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, fabric reinforced or unreinforced, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. 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 one of the following:

a. Bostik, Inc.; Hydroment Blacktop 90210.
b. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
c. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
d. MAPEI Corporation; Mapelastic HPG with MAPEI Fiberglass Mesh.

C. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Bostik, Inc.; Durabond D-222 Duraguard Membrane.
b. Custom Building Products; RedGard Waterproofing and Crack Prevention Membrane.
c. Laticrete International, Inc.; Laticrete Hydro Ban.
d. MAPEI Corporation; Mapelastic AquaDefense.
e. TEC, H. B. Fuller Construction Products Inc.; HydraFlex - Waterproofing Crack Isolation Membrane.

2.5 SETTING MATERIALS

A. Latex-Portland Cement Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Bostik, Inc.
    b. Custom Building Products.
    c. Laticrete International, Inc.
    d. MAPEI Corporation.
    e. TEC; H. B. Fuller Construction Products Inc.

2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
4. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.6 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Bostik, Inc.
    b. Custom Building Products.
    c. Laticrete International, Inc.
    d. MAPEI Corporation.
    e. TEC; H. B. Fuller Construction Products Inc.

2. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.

B. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Bostik, Inc.
    b. Custom Building Products.
    c. Laticrete International, Inc.
    d. MAPEI Corporation.
    e. TEC; H. B. Fuller Construction Products Inc.

2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 deg F, respectively, and certified by manufacturer for intended use.

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. 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.

C. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; Grout Sealer.
b. TEC, H. B. Fuller Construction Products Inc.; Grout Guard Plus Penetrating Grout Sealer.

2. Grout sealers shall comply with requirements of FloorScore certification.

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 the Work.

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 thinset 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/Engineer.

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 thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

    1. Apply a strip of crack isolation membrane over cracks in new concrete floors.

B. 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.

3.3 TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA 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 TCNA 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 consisting of tiles 8 by 8 inches or larger.

c. Tile floors consisting of rib-backed tiles.

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 closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. 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.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic and Porcelain Tile: 3/8 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. 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.

J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

C. Waterproofing to extend 6" above finish floor continuously on all sides of walls.

3.5 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 that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove 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.

3.7 PROTECTION

A. 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.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete

1. Ceramic Tile Installation: TCNA F113; thinset mortar over partial crack suppression membrane.

a. Ceramic Tile Type: Ceramic and quarry tile, as indicated on Drawings in a finish materials schedule.

1) Application: Concrete floor slabs not indicated to receive another installation method.

b. Thinset Mortar: Latex-portland cement mortar.
c. Grout: High-performance sanded grout or epoxy grout as indicated on Drawings in a finish schedule.

2. Ceramic Tile Installation: TCNA F113A; thinset mortar of full installation of crack suppression membrane.

a. Ceramic Tile Type: Ceramic and quarry tile, as indicated on Drawings in a finish materials schedule.

1) Application: Servery.

b. Thinset Mortar: Latex-portland cement mortar.
c. Grout: High-performance sanded grout or epoxy grout as indicated on Drawings in a finish schedule.

B. Interior Wall Installations, Masonry or Concrete:

1. Ceramic Tile Installation: TCNA W202I; thinset mortar.

a. Ceramic Tile Type: As indicated on Drawings in a finish materials schedule.
b. Thinset Mortar: Latex-portland cement mortar.
c. Grout: High-performance sanded grout.

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SECTION 09 51 00
SUSPENDED ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.
B. Acoustical units.

1.02 RELATED REQUIREMENTS

A. Division 7 - Board and Batt Insulation: Acoustical insulation.
B. Division 7 - Joint Sealers: Acoustical sealant.

1.03 REFERENCE STANDARDS

A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2004.

B. ASTM C 636/C 636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2006.

C. ASTM E 580/E 580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2008a.

1.04 SUBMITTALS

A. See Division 1 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two samples 6x6 inch in size illustrating material, edge detail and finish of acoustical units.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Division 1 - Product Requirements, for additional provisions.
2. Extra Acoustical Units: Quantity equal to 5 percent of total installed for each type of acoustical unit.

1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.07 PROJECT CONDITIONS

A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

B. Install acoustical units after interior wet work is dry.

PART 2 – PRODUCTS

2.01 ACOUSTICAL UNITS

A. Manufacturers:
    1. Armstrong World Industries, Inc; www.armstrong.com.
        A. Size: 24" x 24" Square Tegular edge
            1. ACT-1 equal to "Ultima"
            2. ACT-2 equal to "Kitchen Zone"
    2. CertainTeed Corporation: www.certainteed.com.
    3. USG: www.usg.com.
    4. Substitutions: See Division 1 - Product Requirements.

2.02 SUSPENSION SYSTEM(S)

A. Manufacturers:
    1. Same as for acoustical units.
    2. Substitutions: See Division 1 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
C. Exposed Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
    1. Profile: Tee: 15/16" width unless otherwise indicated.

2.03 UNLIT CIRCULAR ACOUSTIC CLOUD

A. Basis of Design: Skydome Edge; by Focal Point.
    1. Sizes:
        a. Diameter: 22.6 inches ("A" on RCP)
        b. Diameter: 33.4 inches ("B" on RCP)
        c. Diameter: 44.7 inches ("C" on RCP)
    2. Installation Method: Suspended
    3. Color: Architect to select up to 3 colors from manufacturer's full range of colors.
    4. Edge Profile: Square
    5. Sound Absorption: ASTM C423; Rating: 1.05 NRC
    6. Fire Rating: ASTM E-84, Class A

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
    5. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
    6. At Concealed Grid: Provide concealed molding.

C. Acoustical Sealant For Perimeter Moldings: Specified in Section 07900.

D. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Locate system on room axis according to reflected plan.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
    7. Install in bed of acoustical sealant.
    8. Use longest practical lengths.
    9. Overlap corners.

K. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

H. Where round obstructions occur, provide preformed closures to match perimeter molding.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Resilient base
2. Resilient molding accessories

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For substitute products only, provide one Sample of each exposed product and for each color and texture specified, not less than 12 inches long.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than the quantity indicated on Drawings in Finish Schedule, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE – RB-1

A. Basis-of-Design: Subject to compliance with requirements, provide products indicated in Finish Schedule on Drawings.

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style and Location:

a. RB-1: Roppe 4" Cove: Provide in areas indicated.

C. Physical Characteristics:

a. Resilient Base (RB-1):

1) Height: 4 inches.
2) Lengths: Coils in manufacturer's standard length.
3) Outside Corners: Field Formed using Coiled Material
4) Inside Corners: Field Formed using Coiled Material
5) Colors: As indicated on Finish Schedule

2.2 VINYL MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.
2. Burke Mercer Flooring Products; a division of Burke Industries Inc.
3. Flexco.
4. Johnsonite; A Tarkett Company.
5. Musson Rubber Co.
6. Roppe Corporation, USA.

B. Description: Vinyl reducer strip for resilient flooring and joiner for tile and carpet.

C. Profile and Dimensions: As indicated.

D. Locations: Provide vinyl molding accessories in areas indicated.

E. Colors and Patterns: As indicated by manufacturer's designations on Drawings in Finish Schedule and Finish Notes.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

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.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

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; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

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 practical 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. Job-Formed Outside Corners: Install corners before installing straight pieces.

G. Job-Formed Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

1. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

2. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 09 65 13

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SECTION 096519 - RESILIENT TILE FLOORING

A. GENERAL

1. SUMMARY

   a. Section Includes: Luxury vinyl and rubber floor tile.

2. ACTION SUBMITTALS

   a. Product Data: For each type of product.

   b. Shop Drawings: For each type of resilient floor tile.

      i. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
      ii. Show details of special patterns.

   c. Samples: Full-size units of each color, texture, and pattern of floor tile required.

3. INFORMATIONAL SUBMITTALS

   a. Qualification Data: For Installer.

4. CLOSEOUT SUBMITTALS

   a. Maintenance Data: For each type of floor tile to include in maintenance manuals.

5. MAINTENANCE MATERIAL SUBMITTALS

   a. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

      i. Floor Tile: Furnish amount as indicated on Drawings in a Finish Legend.

6. QUALITY ASSURANCE

   a. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

i. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

7. DELIVERY, STORAGE, AND HANDLING

a. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

8. FIELD CONDITIONS

a. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:

i. 48 hours before installation.
ii. During installation.
iii. 48 hours after installation.

b. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

c. Close spaces to traffic during floor tile installation.

d. Close spaces to traffic for 48 hours after floor tile installation.

e. Install floor tile after other finishing operations, including painting, have been completed.

B. PRODUCTS

1. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute.

2. PERFORMANCE REQUIREMENTS

a. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

3. SOLID VINYL FLOOR TILE (Designated LVT-Series)

   a. Products: Subject to compliance with requirements, provide products indicated on Finish Legend in Drawings.

   b. Tile Standard: ASTM F 1700.

      i. Class: Class III, Printed Film Vinyl Plank and Tile.
      ii. Backing Class: Commercial Grade
      iii. Finish: Ceramacor

   c. Thickness: 4.5 mm

   d. Size: As indicated on Drawings.

   e. Colors and Patterns: As indicated on Drawings.

4. RUBBER FLOOR TILE (Designated RF-Series)

   a. Products: Subject to compliance with requirements, provide products indicated in a Finish Legend on Drawings.

   b. Tile Standard: ASTM F 1344.

      i. Nora vulcanized rubber compound 925 with environmentally compatible color pigments that area free of toxic heavy metals
      ii. Homogeneous rubber compound with a tone on tone random scattered design
      iii. Smooth Surface

   c. Thickness: 2 mm

   d. Size: 610mm x 610 mm

   e. Colors and Patterns: As indicated on Drawings.

5. INSTALLATION MATERIALS

   a. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

   b. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

   c. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

C. EXECUTION

1. EXAMINATION

a. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

i. 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 floor tile.

b. Proceed with installation only after unsatisfactory conditions have been corrected.

2. PREPARATION

a. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

b. Concrete Substrates: Prepare according to ASTM F 710.

i. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
ii. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
iii. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
iv. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

1. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
2. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

c. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

d. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

   i. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

e. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3. FLOOR TILE INSTALLATION

a. Comply with manufacturer's written instructions for installing floor tile.

b. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

   i. Lay tiles as indicated; see installation plan

c. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

   i. Lay tiles in pattern of colors and sizes indicated on installation plan.

d. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

e. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

f. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

g. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

4. CLEANING AND PROTECTION

a. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

b. Perform the following operations immediately after completing floor tile installation:

   i. Remove adhesive and other blemishes from surfaces.
   ii. Sweep and vacuum surfaces thoroughly.
   iii. Damp-mop surfaces to remove marks and soil.

c. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

d. Floor Polish: Provide only if recommended by tile manufacturer. Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

   i. Apply three coats.

   ii. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.

B. Related Work:

1. Section 096513 "Resilient Base and Accessories."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Amount as indicted on Drawings in a Finish Legend.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.8 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and

ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, Insert failure characteristic and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on Drawings in a Finish Materials Legend or an approved substitute.

2.2 CARPET TILE

A. Carpet Tile (CPT-1)
1. Manufacturer: INTERFACE
2. Collection: Neck of the Woods
3. Pattern: Velvet Back #141700AK00
4. Color: Poplar #106217
5. Size: 25cm x 1M
6. Installation Pattern: See Installation Plan

B. Carpet Tile (CPT-2)
1. Manufacturer: INTERFACE
2. Collection: Neck of the Woods
3. Pattern: Uprooted #141710AK00

4. Color: Poplar #106135
5. Size: 25cm x 1M
6. Installation Pattern: See Installation Plan

C. Carpet Tile (CPT-3)
1. Manufacturer: INTERFACE
2. Collection: Neck of the Woods
3. Pattern: Deeply Uprooted #141720AK00
4. Color: Poplar #106143
5. Size: 25cm x 1M
6. Installation Pattern: See Installation Plan

D. Carpet Tile (CPT-4)
1. Manufacturer: MILLIKEN
2. Collection: Obex Tile
3. Pattern: Cut / Cross #CSC118
4. Color: #119 Dark Grey
5. Size: 50cm x 50cm
6. Installation Pattern: Ashlar

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine

adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

E. Acclimation: Comply with manufacturer’s written instructions and referenced standards for acclimation.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As indicated on Drawings in a finish materials schedule.
1. See detailed carpet pattern plan provided by manufacturer for CPT-1, CPT2, and CPT3.
2. Install per directions on finish schedule for CPT-4 and CPT-5.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

H. Perimeter cuts shall not be less than 6". Where perimeter tile is less than 6", Contractor shall use full size tile cut down to fit.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and prime painting; and wall covering.

B. Related Sections:

1. Section 09 25 5 GYPSUM BOARD ASSEMBLIES.
2. Section 099000 - Painting and Coating: Preparation and priming of substrate surfaces.

1.2 REFERENCES

A. ASTM International:

1. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM F793 - Standard Classification of Wallcovering by Use Characteristics.

B. California Department of Health Services:

1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

C. Federal Specification Unit:

1. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride).

D. National Fire Protection Association:

1. NFPA 265 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls, Method B.
2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish.

E. South Coast Air Quality Management District:

1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.

1.3 SUBMITTALS

A. Section 01300 - Submittals: Submittal procedures.

B. Shop Drawings: Indicate wall elevations with seaming layout.

C. Product Data: Submit data on covering and adhesive.

D. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified: full width by 36 inch long size.

E. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.

F. Manufacturer's Installation Instructions: Submit special procedures, perimeter conditions and areas requiring special attention.

1.4 CLOSEOUT SUBMITTALS

A. Section 01700 – Contract Closeout: Closeout procedures.

B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 –Materials and Equipment: Product storage and handling requirements.

B. Inspect roll materials on site to verify acceptance.

C. Protect packaged adhesive from temperature cycling [and cold temperatures.]

D. Do not store roll goods on end.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01600 –Materials and Equipment.

B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by adhesive or vinyl covering product manufacturer.

C. Maintain these conditions 24 hours before, during, and after installation of adhesive and covering.

D. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

E. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall covering manufacturer for full drying or curing.

1.7 EXTRA MATERIALS

A. Section 01700 – Contract Closeout: Spare parts and maintenance products.

B. Supply 5 percent of each color and pattern of covering; store where directed.

C. Package and label each roll by manufacturer, color and pattern, and destination room number.

PART 2 - PRODUCTS

2.1 WALL COVERING

A. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute. (VWC-1, VWC-2, VWC-3, VWC-4)

B. Adhesive: Mildew resistant, non-staining, strippable adhesive, as recommended by wall covering manufacturers to suit application to substrate and as recommended in writing by wallcovering manufacturers.

C. Substrate Filler: As recommended by adhesive and wall covering manufacturers.

D. Substrate Primer and Sealer: As recommended by wall covering manufacturers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions. Verify substrate surfaces are prime painted and ready to receive work, and conform to requirements of covering manufacturer.

B. Measure moisture content of surfaces using electronic moisture meter. Do not apply coverings unless moisture content of surfaces are below the following maximums:

1. Plaster and Gypsum Wallboard: 5 percent.
2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
3. Wood Surfaces: 15 percent, measured in accordance with ASTM D4442.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at rate greater than 1/16 inch/ft.

3.2 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those which may bleed through surface finishes.

F. Apply primer sealer as per wall covering manufacturers' written installation instructions to substrate surfaces. Allow to dry. Lightly sand smooth.

G. Vacuum clean surfaces free of loose particles.

3.3 INSTALLATION

A. Comply with wall covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Use covering in roll number sequence. Change the roll numbers at partition break and corners.

C. Razor trim edges on flat work table, changing blade often to prevent rough cut edges. Do not razor cut on gypsum board surfaces.

D. Apply covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

E. Horizontal seams are not acceptable.

F. Do not seam within 6 inches of internal corners or within 6 inches of external corners.

G. Install covering before installation of bases, cabinets, hardware, or items attached to or spaced slightly from wall surface.

H. Cover spaces above and below windows, above doors, in pattern sequence from roll.

I. Where covering tucks into reveals, or metal wallboard or plaster stops, apply covering with contact adhesive within 6 inches of covering termination. Ensure full contact bond.

J. Install termination trim.

K. Remove excess adhesive while wet from seam before proceeding to next covering sheet. Wipe clean with dry cloth.

3.4 CLEANING

A. Section 01700 – Contract Closeout: Final cleaning.

B. Clean coverings of excess adhesive, dust, dirt, and other contaminants.

C. Use cleaning methods recommended in writing by wall covering manufacturers.

D. Reinstall wall plates and accessories removed prior to work of this section.

3.5 SCHEDULES

A. See Finish Schedule and Finish Legend for Locations of Wall Covering to be Installed.

END OF SECTION 09 72 00 WALLCOVERINGS

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SECTION 09 90 00

PAINTS AND COATINGS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.

2. Exposed surfaces of steel lintels and ledge angles.

3. Mechanical and Electrical:

a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.

b. In all areas, paint shop-primed items.

c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.

d. Paint dampers exposed behind louvers, grilles, to match face panels.

D. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.

2. Items indicated to receive other finishes.

3. Items indicated to remain unfinished.

4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.

5. Non-metallic roofing and flashing.
6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
7. Marble, granite, slate, and other natural stones.
8. Floors, unless specifically so indicated.
9. Ceramic and other tiles.
10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
11. Glass.
12. Acoustical materials, unless specifically so indicated.
13. Concealed pipes, ducts, and conduits.

1.2 RELATED REQUIREMENTS

A. Section 05 50 00 - Metal Fabrications: Shop-primed items.

1.3 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.4 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2007.

C. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

1.5 DEFINITIONS

A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.6 SUBMITTALS

A. See Division 1 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on all finishing products and special coatings, including VOC content.

1. List each material and cross reference to scheduled paint types, and including each specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.

C. Samples for initial color selection in the form of manufacturer's color charts from paint manufacturer intended for use.

D. Samples: Submit two paper chip samples, 4x8 inch in size illustrating range of colors available for each surface finishing product scheduled.

E. Samples for verification purposes: Provide samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate. Define each separate coat, including fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

F. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Division 1 - Product Requirements, for additional provisions.

2. Extra Paint and Coatings: 1 gallon of each color; store where directed.

3. Label each container with color in addition to the manufacturer's label.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years' experience.

C. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by paint manufacturer, and use only within the recommended limits.

D. Coordination of Work: Review other sections in which primers are provided to ensure compatibility of the total systems for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect of any problems anticipated using the materials specified, prior to proceeding with work.

E. Material Quality: Provide the manufacturer's best quality grade paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude approved equivalent products of other manufacturers.

F. Color Pigments: Pure, non-fading, applicable types to suite substrates and service indicated.

G. Lead content in pigments or other painting materials and components is not allowed.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, pigment and vehicle constituents by volume, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

D. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers, others present or passing through or inspecting work areas (painting or any other work), and the work areas themselves are protected from fire and health hazards resulting from handling, mixing, and application of materials.

1.10 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by the manufacturer, during application, drying and curing periods.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for solvent-thinned Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft. candles measured mid-height at substrate surface.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

B. Paints:

1. Sherwin-Williams: www.sherwin-williams.com.

2. ICI Paints: www.icipaintsinna.com.

3. Benjamin Moore & Co.: www.benjaminmoore.com.

4. PPG Architectural Finishes, Inc: www.ppgaf.com.

5. TNEMEC Company, Inc.

C. Substitutions: See Division 1 - Product Requirements.

2.2 PAINTS AND COATINGS – GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.

1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.

4. Supply each coating material in quantity required to complete entire project's work from a single production run.

5. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:

1. Provide coatings that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

b. Architectural coatings VOC limits of State in which the project is located.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added

to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: As indicated on drawings

1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.3 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.

2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3. Interior Wood: 15 percent, measured in accordance with ASTM D 4442.

4. Exterior Wood: 15 percent, measured in accordance with ASTM D 4442.

5. Concrete Floors and Traffic Surfaces: 8 percent.

3.2 PREPARATION

A. General Procedures: Remove Hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items in place that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items if necessary for complete painting of the items and adjacent surfaces. Following completion of painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

   1. Clean surfaces before applying paint or surface treatments. Remove oil and grease prior to cleaning. Schedule cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

B. Surface Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer's instructions for each particular substrate condition and as specified.

   1. Provide barrier coats over incompatible primers or remove and reprime. Notify Architect in writing of problems anticipated with using the specified finish-coat material with substrates primed by others

   2. Cementitious Materials: Prepare concrete, concrete masonry units, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

      a. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.

      b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

   3. Wood: Clean surfaced of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

      a. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer before application of primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Fill cracks in wood or plywood floors with a

latex filler and primed filled areas after sanding, except where otherwise recommended by paint manufacturer. Sand smooth when dried.

b. Prime, stain, or seal unfinished wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases and paneling.

c. When transparent finish is required, backprime with spar varnish.

d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.

e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.

4. Ferrous Metals: Clean nongalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendation of the Steel Structures Painting Council.

a. Treat bare, sandblasted, or pickled clean metal with a metal treatment was coat before priming.

b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch up with the same primer as the shop coat.

5. Galvanized Surfaces: Clean galvanized surfaces with non-petroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

C. Materials Preparation: Carefully mix and prepare paint materials in accordance with manufacturer's directions.

1. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

2. Stir material before applications to produce a mixture of uniform density; stir as required during applications. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

3. Use only thinners approved by the paint manufacturer, and only within recommended limits.

D. Tinting: Tint each primer and undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat(s), but provide sufficient differences in shade of undercoats to distinguish each separate coat.

1. Finish coats as scheduled, shall be the same color for each coat required.

3.3 APPLICATION

A. Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

2. Paint surface treatments and finishes are indicated on the Drawings and Specifications.

3. Finish colors will be selected after bidding unless otherwise indicated.

4. Provide finish coats that are compatible with primers used.

5. The number of coats and film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where sanding is required to produce an even, smooth surface in accordance with the manufacturer's directions.

6. Apply additional coats when undercoats, stains, or other conditions show through final coat of paint until paint film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

7. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, connector covers, covers for finned tube radiation, grilles, and similar components are in place. Extend coatings in these areas as required to maintain the system integrity and provide desired protection.

8. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

9. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

10. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

B. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

C. Finish doors on tops, bottoms, and side edges same as faces.

1. Sand lightly between each succeeding enamel or varnish coat.

D. Primers:

1. Omit primer on metal surfaces that have been shop-primed and tough-up painted, only after verifying full compatibility of shop primers with materials specified for the next coat and finish coats.

2. Primer may be omitted at previously painted existing surfaces in good condition, except at interior concrete, plaster and drywall surfaces, after repairs to any existing damaged substrates and after spot priming of existing damaged paint finish, followed by cleaning and preparation recommended in writing by paint manufacturer.

E. Schedule Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure and where application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

F. Minimum Coating Thickness: Apply materials at not less than the manufacturer's recommended spreading rate. Provide a total dry thickness of the entire system as recommended by the manufacturer.

G. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed in mechanical rooms and in occupied spaces.

1. Mechanical items to be painted include, but are not limited to:

a. Piping, pipe hangers, and supports

b. Tanks

c. Ductwork

d. Insulation

e. Supports

f. Accessory items

2. Electrical items to be painted include, but are not limited to:

a. Conduit and fittings

b. Switchgear

H. Block Fillers: Apply block fillers to new or previously unpainted concrete masonry units at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before application of finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to assure a finish coat with no burn through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be accepted.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface of film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

L. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements.

3.4 CLEANING

A. Cleanup: At the end of each work day, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

B. Upon completion of painting, clean glass and paint spattered surfaces. Remove spattered paint by washing and scraping, using care not to scratch or damage adjacent finished material.

C. No scraping will be allowed to remove paint from Pre-finished storefront, louvers, or other pre-finished items.

3.5 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

B. Provide "wet paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 SCHEDULE – EXTERIOR PAINT SYSTEMS

A. Iron and Steel Surfaces:

1. S-W:

a. Primer: Kem Kromik Universal Metal Primer, B50WZ0001

b. Finish (2 Coats): Pro Industrial Urethane Alkyd Enamel, Gloss, B54-150

B. Galvanized Steel and Aluminum Surfaces:

1. S-W:

a. Primer: Kem Kromik Universal Metal Primer, B50WZ0001

b. Finish: (2 Coats): Pro Industrial Urethane Alkyd Enamel, Gloss, B54-150

C. CMU and Masonry Surfaces:

1. S-W: Acrylic Latex Block Filler; Brush and Roller Application only.

a. CMU Block Filler: Pro Industrial Heavy Duty Block Filler, B42W150

b. Masonry Primer: Loxon Concrete & Masonry Primer, LX02W0050

c. Finish (2 coats): Pro Industrial DTM Acrylic Semi-Gloss, B66-W01151 Brush and Roller application only.

d. All block pores shall be completely filled.

D. Painted Wood Surfaces (Opaque Finish):

1. S-W:

a. Primer: (For spot priming pine knots) Exterior Oil Based Wood Primer, Y24W08020 or Extreme Block Stain Blocking Primer / Sealer, B51W00100

b. Finish (2 coats): Pro Industrial DTM Acrylic Semi-Gloss, B66-W01151 Brush and Roller application only.

E. Painted Plywood Surfaces:

1. S-W:

a. Primer: (For spot priming pine knots) Exterior Oil Based Wood Primer, Y24W08020 or Extreme Block Stain Blocking Primer / Sealer, B51W00100

b. Finish (2 coats): Pro Industrial DTM Acrylic Semi-Gloss, B66-W01151

3.07 SCHEDULE – INTERIOR PAINT SYSTEMS

A. Iron and Steel Surfaces:

1. S-W :

a. Primer: Kem Kromik Universal Metal Primer, B50WZ0001 or Pro Industrial Pro-Cryl Universal Acrylic Primer, B66W01310

b. Finish (2 Coats): Pro Industrial Urethane Alkyd Enamel, B54-150 or Pro Industrial Waterbased Alkyd Urethane Enamel, B53 Series

2. Note: Provide equivalent "dry'fall" product, spray-applied finish coats, over primer for any steel structure and exposed steel decking which will remain exposed after other work and improvements;

2 Coats; S-W Pro Industrial Waterborne Acrylic Dryfall, Flat, B42W00181 or EgShel, B42W00182

3. Completely cover and protect entire floor in rooms where occurs, prior to applications.

B. Galvanized Steel and Aluminum Surfaces:

1. S-W:

a. Primer: Kem Kromik Universal Metal Primer, B50WZ0001 or Pro Industrial Pro-Cryl Universal Acrylic Primer, B66W01310

b. Finish: Pro Industrial Urethane Alkyd Enamel, B54-150 or Pro Industrial Waterbased Alkyd Urethane Enamel, B53 Series

C. Plaster and Concrete Surfaces:

1. S-W:

a. Primer: Loxon Concrete & Masonry Primer, LX02W0050

1. Number of coats as required to conceal minor wall irregularities, imperfections, differing textures, etc.

   a. Finish (2 Coats): ProMar 200 HP Zero VOC Interior Acrylic Eg-Shel, B20W01951

D. Wood Surfaces to be Painted (Opaque Finish):

1. S-W:

   a. Primer (exposed and concealed surfaces, back-priming, etc.) Premium Wall & Wood Interior Latex Primer, B28W08111

   b. Finish (2 coats): ProMar 200 Alkyd Semi-Gloss Enamel, B34W00251 or ProClassic Waterborne Interior Acrylic Enamel, B31W02151

DI. Wood Surfaces to receive Natural Finish (Stained):

1. S-W:

   a. First Coat: Alkyd Interior Paste Wood Filler, fully compatible with other finish system products below.

   b. Second Coat: Minwax Performance Series Stain; Wiped. Two version 550 VOC or 250 VOC

   c. Third Coat: Minwax Performance Series Fast Dry Interior Polyurethane Satin Varnish. Also available in S/G or Gloss finishes

   d. Fourth Coat: Minwax Performance Series Fast Dry Interior Polyurethane Satin Varnish. Also available in S/G or Gloss finishes

2. Natural finish (stained) shall be typical finish, unless indicated otherwise for:

   a. New wood doors, unless specifically indicated otherwise.

   b. Elsewhere as indicated on the Drawings.

DII. Drywall Surfaces – Dry Areas:

a. Primer: (This primer only, spray-applied) ProMar 200 Zero VOC Interior Latex Primer, B28W02600 or High Build Interior Latex Primer, B28W08601

Number of coats as required to conceal minor wall irregularities, imperfections, differing textures, joint taping and mudding, etc., prior to finish coats.

1. S-W

   a. Finish: ProMar 200 Alkyd EgShel, B33W00251

option:

   b. Finish: ProMar 200 HP Zero VOC Acrylic Eg-Shel, B20W01951

H. Drywall Surfaces – Wet Areas (Toilet, Lockers, Shower & Janitor Rooms, Kitchen

Areas, any room with a plumbing fixture, and areas where food is stored, prepared, cooked and/or served):

1. S-W:

   a. Primer: (This primer only, spray-applied) ProMar 200 Zero VOC Interior Latex Primer, B28W02600 or High Build Interior Latex Primer, B28W08601

Number of coats as required to conceal minor wall irregularities, imperfections, differing textures, joint taping and mudding, etc., prior to finish coats.

   b. Finish (2 coats) Pro Industrial Water based Catalyzed Epoxy, Gloss, B73-300 Series / B73V00300 Hardener (Eg-Shel finish, B73-360 Series

I. CMU and Brick Surfaces – Dry Areas:

1. S-W:

   a. Primer: Pro Industrial Heavy Duty Block Filler, B42W150.

   b. Finish (2 coats): ProMar 200 Alkyd Semi-Gloss Enamel, B34W00251; Brush and Roller application only.

J. All block pores shall be completely filled.

CMU and Brick Surfaces – Wet Areas (Toilet, Lockers, Shower & Janitor Rooms, Kitchen Areas, any room with a plumbing fixture, and areas where food is stored, prepared, cooked and/or served):

1. S-W:

   a. Primer: Pro Industrial Heavy Duty Block Filler, B42W150. Brush and Roller application only.

   b. Finish (2 Coats): Pro Industrial Water based Catalyzed Epoxy, Gloss, B73-300 Series / B73V00300 Hardener (Eg-Shel finish, B73-360 Series

   c. Brush and Roller application only.

   d. All block pores to be completely filled.

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SECTION 10 14 00

SIGNAGE

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.

B. Related work specified elsewhere includes:

1. Division 1 - "Allowances"

2. Division 4 - "Unit Masonry Assemblies"

3. Division 9 - "Gypsum Board Assemblies"

4. Divisions 22-28 (labels, tags, nameplates, etc., for plumbing, Mechanical, and Electrical equipment, devices, etc.).

1.2 SUMMARY

A. This Section includes the following types of signs:

1. Framed and Unframed Panel Signs: As designed by manufacturer to comply with U.S. Department of Justice Regulations for the "Americans With Disabilities Act of 1990," (ADA; ADA-AG); the "Uniform Federal Accessibility Standards," (UFAS), 1988 edition; applicable codes and standards; And revisions and amendments thereto.

a. Design: Integral tactile raised letters, numbers, Braille, and/or graphics, as indicated on the Drawings, or if not indicated, as furnished by Architect after Bid Date.

b. Fabricated of acrylic plate with graphics chemically welded to sign face, resulting in a homogeneous end product; Except surface-mounted glued-on graphics, etc., are not acceptable.

2. Prefinished cast aluminum plaque (1 required):

a. Copy: To be Verified by Architect during Shop Drawing Submittals.

b. To be furnished under Base Bid; Refer to detail at "General Conditions" section of the Project Manual.

3. Pre-finished cast aluminum letters for building/school name (as indicated on drawings).

4. Traffic signs.

1.3 SUBMITTALS

A. General: Submit the following in accordance with conditions of the contract and Division 1 Specification Sections.

1. Product Data: Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

2. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

a. Provide message list for each sign required, including large-scale details of wording and layout of lettering, graphics, etc.

b. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.

3. Samples: Provide the following samples of each sign component for initial selection of color, pattern and surface texture as required and for verification of compliance with requirements indicated.

a. Cast Acrylic Sheet and Plastic Laminate: Manufacturer's color charts consisting of actual sections of material including the full range of colors available for each material required.

b. Aluminum: Samples of each finish type and color, on approximately 4-inch squares of sheet or plate, showing the full range of colors available.

4. Samples for verification of color, pattern, and texture selected, and compliance with requirements indicated:

a. Cast Acrylic Sheet and Plastic Laminate: Provide a sample panel of a sign intended for use on this project, or of not less than 6-inches by 8-inches for each material indicated. Include a panel for each color, texture, and pattern required. On each panel include a representative sample of the graphic image process required, showing graphic style, and colors and finishes of letters, numbers, and other graphic devices.

b. Aluminum: Samples of each finish type and color, on 6-inch long sections of extrusions or approximately 4-inch squares of casting, sheet or plate. Where finishes involve normal color and texture variations include sample sets showing the full range of variations expected.

5. Furnish full-size rubbings for metal plaques for final approval prior to fabrication.

1.4 QUALITY ASSURANCE

A. Single-Source Responsibility: For each separate type of sign required, obtain signs from 1-source from a single manufacturer.

B. Design Criteria: The Drawings, and this Section, indicate sizes, profiles, and dimensional requirements of signs. Other signs with deviations from indicated dimensions and profiles may be considered, provided deviations do not change the design concept. The burden of proof of equality is on the proposer.

1.5 PROJECT CONDITIONS

A. Verify project conditions and substrates, coordinate placement of blocking and anchorages, etc., as required for proper execution of the work of this Section.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Manufacturers of Panel Signs and Wall Mounted Signs:

a. ABC Architectural Signing System, Division of Nelson-Harkins Industries.

b. Allenite, A Division of Allen Marking Products, Inc.

c. Andco Industries Corp.

d. APCO Graphics, Inc.

e. Architectural Graphics, Inc.

f. ASI Sign Systems, Inc.

g. Best Manufacturing Co.

h. First Source Signs & Design

i. Leeds Architectural Letters, Inc.

j. Modulex.

k. Mohawk Sign Systems.

l. Spanjer Brothers, Inc.

m. The Supersine Company.

n. Vomar Products, Inc.

2. Manufacturers of Cast Aluminum Plaques, and Cast Aluminum Dimensional Letters and Numbers:

a. Andco Industries Corp.

b. A.R.K. Ramos Manufacturing Company, Inc.

c. ASI Sign Systems, Inc.

d. First Source Signs & Design

e. Gemini, Inc.

f. Leeds Architectural Letters, Inc.

g. Metal Arts, Division of L & H Manufacturing Co.

h. The Southwell Company.

i. Spanjer Brothers, Inc.

j. Steel Art Company, Inc.

2.2 MATERIALS

A. Cast Acrylic Sheet: Provide manufacturer's standard methyl methacrylate monomer plastic sheet, in sizes and thicknesses indicated, with a minimum flexural strength of 16,000 psi when tested in accordance with ASTM D 790, a minimum allowable continuous service temperature of 176°F (80°C), and of the following general types or equivalent to products used for standard LA100 Acrylic Process by Leeds Architectural Letters, Inc.:

   3. White Translucent Sheet: Where sheet material is indicated as "white," provide white translucent sheet of density required to produce uniform brightness and minimum halation effects.

   4. Opaque Sheet: Where sheet material is indicated as "opaque," provide colored opaque acrylic sheet in colors and finishes as selected from the manufacturer's standards.

B. Aluminum Sheet: Provide aluminum sheet of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209 for 5005-H15.

C. Aluminum Extrusions: Provide aluminum extrusions of alloy and temper recommended by the aluminum producer or finisher for the type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5.

D. Aluminum Castings: Provide aluminum castings of alloy and temper recommended by the aluminum producer and finisher for the casting process used and for the use and finish indicated.

E. Fasteners: Use concealed fasteners fabricated from metals that are not corrosive to the sign material and mounting surface.

   1. Exposed screws and bolts on exterior: Stainless steel.

F. Anchors and Inserts: Use nonferrous metal or hot-dipped galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.3 PANEL SIGNS

A. Panel Signs: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

   1. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16-inch measured diagonally.

B. Framed and Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements, unless otherwise selected:

   1. Edge Condition: square, unless otherwise indicated.

   2. Edge Color for Acrylic Sheet: Edge color same as background.

   3. Corner Condition: Radius corners.

   4. Size: 6-inches x 8-inches (nominal; minimum), unless indicated otherwise.

C. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.

D. Raised Copy: Copy characters and Braille from matte-finish opaque acrylic sheet and chemically weld onto the acrylic sheet forming an integral and permanent sign panel face. Produce precisely formed characters with square cut edges free from burrs and cut marks.

   1. Panel Material: Matte-finished opaque acrylic sheet.

   2. Raised Copy Thickness: Not less than 1/32-inch.

2.4 CAST METAL PLAQUES

A. Plaques: Castings shall be free from pits, scale, sand holes, or other defects. Comply with requirements specified for metal, border style, background texture, and finish and with requirements shown for thickness, size, shape, and copy. Hand-tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish. Refer to "Finish" article for other finish requirements.

1. Metal: Aluminum.

2. Border Style: Double raised line border with plain bevel edge, or as selected.

3. Background Texture: Manufacturer's standard pebble texture, or as selected.

4. Background Finish: Provide dark statuary finish (Kynar 500), to comply with the requirement specified for bronze finishes, except provide background texture specified above in lieu of mechanical finish.

5. Back of Plaques: Seal with manufacturer's standard clear, transparent, and non-yellowing lacquer, or similar finish with same characteristics and acceptable to Architect; Two coats minimum.

2.5 CAST ALUMINUM LETTERS

A. Height and size as indicated on the drawings. Letters shall be cast from 514 aluminum alloy.

B. Provide cast aluminum letters for Monumental Sign and Building face. Include street number at both locations.

C. Requirements:

   a. Finish: Dark Bronze Anodized, belt sanded faces, bead-blasted returns, no clear coat.

   b. Mounting: blind stud standard

   c. Font: Optima Semi Bold

2.6 TRAFFIC SIGNS

A. Aluminum Sheet: With letters and graphics indicated.

2.7 FINISHES

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the Architect from the manufacturer's standards.

B. Metal Finishes: Comply with NAAMM "Metal Finishes Manual" for finish designations and applications recommendations.

C. Aluminum Finishes: Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

1. Class II Clear Anodized Fine Satin Finish: AA-M31C21A31 (Mechanical Finish: Fine satin directional textured; Chemical Finish: Fine matte etched finish; Anodic Coating: Class II Architectural, clear film thicker than 0.4-mil).

D. Baked Enamel Finish: AA-M4xC12C42R1x (Mechanical Finish: Manufacturer's standard, other nondirectional textured; Chemical Finish: Chemical conversion coating, acid chromate-fluoride-phosphate pretreatment; Organic Coating: as specified below). Apply baked enamel in compliance with paint manufacturer's specifications for cleaning, conversion coating, and painting.

1. Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with a minimum dry film thickness of 1.5-mils, medium gloss.

a. Color: As selected by the Architect from the manufacturer's standard colors.

b. Product: 3-coat, 70-percent "Kynar 500," or pre-approved equivalent.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's written instructions.

1. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

2. Coordinate proper placement of treated grounds and blocking by the Contractor.

B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using the methods indicated below:

1. Adhesive Mounting: Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign securely in place. Where also recommended or as required by project conditions, use liquid silicone adhesive recommended by the sign manufacturer to attach sign units to irregular, porous, or vinyl-covered surfaces.

2. Mounting height: 60-inches above finished floor (A.F.F.) to top of sign.

    a. Multiple signs shall align side-by-side or stacked vertically, as indicated, or if not indicated, as directed by the Architect.

C. Cast Metal Plaques: Mount plaques using the standard method recommended by the manufacturer for the type of wall surface indicated.

1. Concealed Mounting: Mount the plaques by inserting threaded studs into tapped lugs on the back of the plaque. Set in pre-drilled holes filled with quick-setting cement.

D. Building Lettering: Mount letters onto building using the standard method recommended by the manufacturer for the type of wall surface indicated.

1. Concealed Mounting: Unless recommended otherwise by manufacturer, mount the letters by inserting threaded studs into tapped lugs on the back of the letters. Set in pre-drilled holes filled with quick-setting cement.

E. Traffic Signs: Install as indicated on Site Drawings, in accordance with requirements of applicable authorities.

END OF SECTION 10 14 00

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PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stainless steel toilet compartment partitions**:** floor mounted, overhead braced for following applications:

   a. Toilet enclosures.
   b. Privacy screens.
   c. Urinal screens.

A. Related Requirements:

1. Division 03 Section "Cast in Place Concrete" for compartment anchorage to concrete substrates.
2. Division 05 Section "Metal Fabrications" for miscellaneous structural and support metal components required to secure compartments.
3. Division 06 Section "Rough Carpentry" for compartment anchorage to frame walls.

1.2 REFERENCES

A. ASTM International (ASTM):

1. ASTM A 240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
3. ASTM A 743/A 743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
4. ASTM B 86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM B 221/B 221M - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings.

B. International Code Council (ICC)/American National Standards Institute (ANSI):

1. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities, as applicable to toilet compartments designated as accessible.

C. United States Department of Justice:

1. ADA - Americans with Disabilities Act, Excerpt from 28 CFR Part 36 - ADA Standards for Accessible Design.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets for each type of product indicated. Include fabrication details, description of materials and finishes.

1. Product Test Reports: When requested by Architect, submit documentation by qualified independent testing agency indicating compliance of products with requirements.

B. Shop Drawings: Include overall product dimensions, floor plan, elevations, sections, details, and attachments to other work. Include choice of options with details.

C. Samples for Verification: Furnish physical sample of material in selected finish.

1. Size: 2 by 2 inch minimum, in type of finish specified.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance and cleaning instructions.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 year's experience in the manufacture of toilet compartments.

B. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 year's experience in the manufacture of toilet compartments. Manufacturers seeking approval must submit the following in accordance with Instructions to Bidders and Division 01 requirements:

1. Product data, including test data from qualified independent testing agency indicating compliance with requirements.
2. Samples of each component of product specified.
3. List of successful installations of similar products available for evaluation by Architect.

C. Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum 3 years.

D. Source Limitations: Obtain toilet compartment components and accessories from single manufacturer.

E. Accessibility Requirements: Comply with requirements of ICC/ANSI 117.1, and with requirements of authorities having jurisdiction.

F. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 0.
2. Smoke-Developed Index: 0.

G. Indoor Environmental Quality Certification: Provide certificate indicated that products have been certified under the following programs, or a comparable certification acceptable to Owner:

1. GREENGUARD Indoor Air Quality Certified.
2. GREENGUARD Certified for Children and Schools.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation.

3. Deliver toilet compartments in manufacturer's original packaging.
4. Store in an upright condition.

1.8 WARRANTY

A. Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:

5. Stainless Toilet Partitions: Against rust-out: 15 years.

1. Chrome Hardware: 5 years.

2. Stainless Steel Hardware: Lifetime.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of Bradley Corporation, The Mills Company, Marion, OH 43302.

2.2 MATERIALS

A. Stainless Steel Sheet: A 666, 300 series commercial stainless steel sheet suitable for exposed applications. Provide smooth material, without creases or ripples.

1. Provide with No. #4 finish.

B. Stainless Steel Castings: ASTM A 743/A 743M.

C. Zinc Aluminum Magnesium and Copper Alloy (Zamac): ASTM B 86.

D. Aluminum: ASTM B 221/B 221M.

2.3 STAINLESS STEEL TOILET COMPARTMENTS

A. Toilet Compartment Type:

1. Overhead braced.

a. Basis of Design Product: Bradley, Mills Partitions, Sentinel, Series 400.

B. Urinal Screen Style:

1. Wall hung with wing bracket:

a. Basis of Design Product: Bradley, Mills Partitions, Model No. 2.
b. Provide with continuous bracket in addition to wing bracket.

2. Floor anchored:

a. Basis of Design Product: Bradley, Mills Partitions, Model No. 3.
b. Floor mounted, requiring concrete floor, minimum 3 inches thick for anchoring.
c. Where indicated on Drawings, modify to become floor-to-ceiling mounted by changing mounting pilaster.

3. Wall-hung with Brackets:

a. Basis of Design Product: Bradley, Mills Partitions, Model No. 4.
b. Provide with continuous bracket in addition to wing bracket.

D. Door, Panel, and Pilaster Construction, General: Form edges with interlock to provide watertight fit without crown molding. Braze corners and finish smooth.

1. Provide exposed surfaces free of pitting, visible seams and fabrication marks, stains, telegraphing of core material, or other imperfections.
2. Core Material: Manufacturer's standard sound-deadening, water resistant honeycomb in thickness required to provide finished thickness for doors, panels and pilasters.

E. Door Construction: 1 inch (25 mm) thick, constructed from 0.0313 inch/22 ga (0.794 mm) stainless steel.

1. Provide each door with internal 0.0625 inch/16 ga and 0.0781 inch/14 ga welded reinforcements at top and bottom hinge locations, with factory installed concealed true gravity cam hinges.
2. Provide pre-punched hole to permit field installation of ADA-compliant concealed slide latch.

F. Panel Construction: 1 inch thick, constructed from 0.0313 inch/22 ga stainless steel.

1. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.

G. Pilaster Construction: 1 1/4 inch thick, constructed from 0.0375 inch/20 gauge stainless steel.

1. Provide pilaster with internally welded bracket suitable to accept minimum 3 inch long, 5/16 inch stainless steel hex bolt for leveling.

H. Headrail: Extruded anodized aluminum headrail with anti-grip profile. Provide fasteners for attachment to pilaster and stainless steel brackets to secure to wall.

I. Shoes: 4 inches high minimum, Type 304 stainless steel with No. 4 satin brushed finish. Secured to the floor with tamper-resistant screws.

J. Urinal-Screen Construction: Matching toilet compartment panel construction

2.4 HARDWARE

A. Hardware, Heavy Duty: Manufacturer's heavy-duty stainless steel castings, including stainless steel tamper-resistant fasteners:

1. Hinges: Self-closing **[**wrap-around gravity-type**] [**continuous spring-loaded type**]**, adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door. Mount with stainless steel through-bolts.

2. Latch and Keeper: Concealed slide latch with wrap-around rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.
3. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors. Mount with stainless steel through-bolts.
4. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

2.5 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

C. Door Size and Swings: Unless otherwise indicated, provide 26-inch wide, in-swinging doors for standard toilet compartments and 36-inch wide, out-swinging doors with a minimum 32-inch wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine work area to verify that measurements, substrates, supports, and environmental conditions are in accordance with manufacturer's requirements to allow installation.

1. Proceed with installation once conditions meet manufacturer's requirements.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Install toilet partitions and screens in spaces with operating, temperature controlled HVAC systems. Shield partitions and screens from direct sunlight.

C. Clearances: Install with clearances indicated on Drawings. Where clearances are not indicated, allow maximum 1/2 inch between pilasters and panels, and 1 inch between panels and walls.

D. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 15 degrees from closed position when unlatched. Set hinges on out-swinging doors **[** and doors in privacy screens**]** to return doors to fully closed position.

3.4 FINAL CLEANING

A. Remove packaging and construction debris and legally dispose of off-site.

B. Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION 10 21 13.15 STAINLESS STEEL TOILET COMPARTMENTS

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SECTION 102600 - WALL AND CORNER GUARDS

PART 1 - GENERAL

A. SUMMARY

A. Section Includes:
1. Corner guards.

B. ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.

B. Shop Drawings: For each type of wall and door protection showing locations and extent.

1. Include plans, elevations, sections, and attachment details.

C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.

1. Include Samples of accent strips and accessories to verify color selection.

C. INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of handrail.

B. Material Certificates: For each type of exposed plastic material.

C. Sample Warranty: For special warranty.

D. CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and

use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

E. DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
2. Keep plastic materials out of direct sunlight.
3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).

a. Store corner-guard covers in a vertical position.

PART 2 - PRODUCTS

A. MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products from single source from single manufacturer.

B. PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing 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: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

C. CORNER GUARDS

A. Surface-Mounted, Opaque-Plastic Corner Guards: Fabricated as one piece from PVC plastic; with formed edges; fabricated with 90- or 135-degree turn to match wall condition. Equal to: Acrovyn SSM-20N.
1. Wing Size: Nominal 2" by 2" inches.

2. Mounting: On extruded aluminum retainers; continuous.
3. Color and Texture: See Finish Schedule.

D. MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

E. FABRICATION

A. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

B. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

F. FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. 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

A. EXAMINATION

A. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

B. PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

C. INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.

1. Provide anchoring devices and suitable locations to withstand imposed loads.
2. Adjust top caps as required to ensure tight seams.

C. Mounting Height: Install full height corner guard starting at top of resilient base.

D. CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 10 26 00

SECTION 10 28 00

TOILET BATH & LAUNDRY ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. The extent of toilet and other accessory items is indicated on the Drawings, in this Section 10 28 00, and as follows: [verify all items are used- modify as necessary]

1. Paper Towel and Trash receptacle
2. Paper towel dispensers
3. Toilet tissue dispensers
4. Grab bars.
5. Soap dispensers
6. Mirrors (Toilets)
7. Mirrors (Weight/Fitness type Rooms)
8. Mop holder with shelf.
9. Robe/Towel hooks
10. Shower Rods
11. Shower curtain and hooks

12. Sanitary napkin disposal

13. Baby changing station.

14. ADA Shower seats.

15. Swimsuit Water Extractor

1.3 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections.

1. Product Data for each toilet accessory item specified, including details of construction relative to materials, dimensions, gauges, profiles, method of mounting, specified options, and finishes.

2. Setting Drawings: Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

1.4 QUALITY ASSURANCE:

A. Inserts and Anchorages: Furnish inserts and anchoring devices that must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

B. Single-Source Responsibility: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise acceptable to Architect.

1.5 PROJECT CONDITIONS:

A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

1.6 WARRANTY:

A. Special Project Warranty: Provide manufacturer's written 15-year warranty against silver spoilage of mirrors, agreeing to replace any mirrors that develop visible defects within warranty period.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

B. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following and which are equivalent to the units specified:

1. Accessory Specialties, Inc.
2. A & J Washroom Accessories.
3. American Specialties, Inc. (ASI)
4. Bobrick Washroom Equipment, Inc.
5. Bradley Corporation.
6. General Accessory Manufacturing Co.
7. Georgia-Pacific [Basis of Design]

2.2 MATERIALS, GENERAL:

A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22-gauge (.034-inch) minimum thickness, unless otherwise indicated.

B. Brass: Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16, Castings, ASTM B-30.

C. Sheet Steel: Cold-rolled, commercial quality ASTM A 366, 20-gauge (.040-inch) minimum, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 527, G60.

E. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.

F. Baked Enamel Finish: Factory-applied, gloss white, baked acrylic enamel coating.

G. Mirror Glass: Nominal 6.0-mm (0.23-inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating,

and protective organic coating. Provide with continuous edge sealer prior to installation in frame.

H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

I. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

J. Keys: Unless otherwise indicated, provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of 6-keys to Owner's representative and obtain receipt.

2.3 PAPER TOWEL DISPENSER/TRASH CAN RECEPTACLE: [verify if used]

A. Recessed towel dispensers: Fabricate of stainless steel sized to dispense not less than 425 linear feet of roll towels, without use of special adapters, door equipped with tumbler lockset.

B. Manufacturer/Model No.:

1. Georgia-Pacific No. 59466 [Basis of Design]

2. Other pre-approved manufacturers

C. Mounting Height: 3'-4" A.F.F. to towel dispensing opening.

D. Location: Where indicated on the Drawings.

E. Recessed Trash Receptacle: for 12" wide Cavity minimum, Stainless steel, 8 gallon capacity.

1. Manufacturer:

a. Georgia-Pacific No. 59451 [Basis of Design]

b. Other pre-approved manufacturers

2.4 PAPER TOWEL DISPENSERS:

A. Surface-mounted towel dispensers: Fabricate of stainless steel sized to dispense not less than 400 C-fold or 525-multi-fold paper towels without use of special adapters, door equipped with tumbler lockset. [verify]

B. Manufacturer/Model No.:

1. ASI No. 0210.

2. Bobrick No. B-262.

3. Bradley No. 250-15.

C. Mounting Height: 3'-4" A.F.F. to towel dispensing opening.

D. Location: Where indicated on the Drawings.

2.5 TOILET TISSUE DISPENSERS:

A. Double-Roll Dispenser: Size to accommodate two separate rolls of core type tissue to 5-inch diameter.

2. Controlled delivery not permitted.

3. Semi-recessed type required at toilet stalls for the disabled and handicapped.

B. Fabrication: Molded plastic spindle with semi-recessed satin finished stainless steel housing at walls, and satin finished cast aluminum at toilet partition walls.

C. Manufacturer/Model No.: Surface Mounted:

1. Bradley Model No.: 5234 [Basis of Design]

D. Mounting:

1. 1'-7" A.F.F., to horizontal centerline.

2. 36-inches from wall behind toilet fixture to forward edge.

E. Locations: At each toilet fixture.

2.5 GRAB BARS:

C. Stainless Steel Type: Provide 1-1/2-inches outside diameter heavy-duty grab bars with wall thickness not less than 18-gauge (.050-inch) and as follows:

1. Mounting: Concealed, manufacturer's standard flanges and anchorages, with concealed mounting plate secured by four stainless steel vandal-resistant set screws.

2. Clearance: 1-1/2-inches clearance between wall surface and inside face of bar.

3. Gripping Surfaces: Manufacturer's standard nonslip texture.

4. Locations, Size, and Configurations: As indicated on the Drawings.

5. Manufacturer/Series No.:

    a. ASI Series 3200 P.

    b. Bobrick Series B-6806.99.

    c. Bradley Series 812.

6. Mounting Height: 2'-9" A.F.F., unless indicated otherwise, to horizontal centerline of bar.

7. Provide lengths indicated on Drawings.

2.6 SOAP DISPENSERS: [verify type used- below used for Lawson State]

A. Wall Mounted Liquid Soap Dispenser: Minimum 700mL capacity dispenser.

    1. Equip unit with push-type valve for dispensing soap in foam form.

    2. Chrome finish

B. Location: 1-unit at each toilet room and other lavatory, at each counter sink, and as otherwise indicated.

C. Manufacturer/Model No.:

    1. GOJO ADX-7 [Basis of Design]

    2. Other pre-approved manufacturers

D. Mounting Height: 40-inches A.F.F. to operating valve.

E. Accessories: Provide Floor & Wall Protector similar to "GOJO 1045-blk-12 shield"

2.7 SOAP DISPENSERS: [verify type used- CWA typical]

A. Wall Mounted Liquid Soap Dispenser: Minimum 40-fluid ounce capacity dispenser.

1. Equip unit with push-type valve for dispensing soap in foam form.

B. Location: 1-unit at each toilet room and other lavatory, at each counter sink, and as otherwise indicated.

C. Manufacturer/Model No.:

1. Bradley No. 6A01-11 [Basis of Design]

D. Mounting Height: 40-inches A.F.F. to operating valve.

2.8 MIRROR UNITS (TOILETS):

A. Stainless Steel Framed Mirror Units: Fabricate frame with angle shapes of not less than 18-gauge, with square welded corners mitered and ground smooth. Provide with No. 4 satin polished finish.

B. Locations: At each lavatory in each Toilet Room, and as otherwise indicated.

C. Mountings: Concealed type, manufacturer's standard.

D. Manufacturer/Model No.: Standard:

1. Bradley Series: 780 Series [verify]

2. Size:

d. 18" x 36" at Rooms 109, 113, 118, 122, 156, 167, and 266

e. 60" x 36" at Rooms 144, 146, 154, 158, 205, 207, 264, and 268

3. Mounting Height: 40-inches A.F.F. to bottom of mirror.

E. Mirror Types:

1. Provide ¼" (6mm) thick, float glass, triple silvered, electro-copper plated with baked enamel finish, at all other locations [verify]

2. Provide ¼" (6mm) thick, laminated glass, triple silvered, electro-copper plated with baked enamel finish, at all mirrors in pool, locker rooms, and locker room toilet areas. [verify]

2.9 MIRROR UNITS (WEIGHT EQUIPMENT/GROUP FITNESS):

A. Frameless Mirror Units: Provide frameless mirrors with flat, polished edge

B. Locations: Weight Equipment and Group Fitness Rooms

C. Mountings: L-bar at top and bottom, manufacturer's standard.

D. Manufacturer/Model No.: Standard:

1. Dulles Glass: Gym Mirror Series- Clear type

2. Size:

f. 48" x 84" at 125B, 200, and 204

g. 36" x 84" at 125B (Provide 2 at west wall)

h. See Plans for quantities

3. Mounting Height: 18-inches A.F.F. to bottom of mirror.

2.10 MOP HOLDER WITH SHELF:

A. Manufacturer/Model No:

1. ASI No. 1315.

2. Bobrick No. B-224 x 30-inches long.

3. Bradley No. 9983.

B. Mounting Height: 60-inches A.F.F. to top of shelf.

C. Locations: 1-each at each Janitors Room, over mop sink, on opposite wall from plumbing.

2.11 ROBE/TOWEL HOOKS: [verify if used]

A. Manufacturer's standard stainless steel single robe hook, 2-inch x 2-inch flange, projecting approximately 2-inches from wall, with bright polished stainless steel finish. Concealed surface-mounted unit. Bright polished stainless steel.

B. Manufacturer/Model No.:

1. ASI No. 7340.

2. Bobrick No. B-671.

3. Bradley No. 9115.

C. Mounting Height: 48-inches A.F.F. to top of horizontal projection of robe hook.

D. Location: One at each shower, at wall outside shower where indicated, or if not indicated, as directed by Architect.

2.12 SHOWER CURTAIN RODS: [verify if used]

A. Manufacturer's standard heavy duty, 1-1/4-inch O.D., Type 304 satin finish stainless steel shower curtain rod, with concealed mounting.

B. Locations:

1. At each shower opening; and

2. At each shower drying/dressing area opening.

C. Manufacturer/Model No.:

1. Bradley No. 9531

D. Mounting Height: As indicated on the Drawings, or if not indicated, as directed by Architect or Owner's Representative, to accommodate shower curtain length and curtain hooks.

2.13 SHOWER CURTAINS AND HOOKS: [verify is used]

A. Manufacturer's standard commercial quality, 0.008-inch (0.2 mm), opaque vinyl shower curtains with brass grommets at 6-inches o.c. at top edge, and anti-microbial treatment, and Type 304 stainless steel shower curtain hooks.

B. Manufacturer/Model No.: Hooks: Curtain: Curtain Size:

1. Bradley Series: 9536 9537 See Drawings for opening size

C. Location: Curtains at each shower opening, and curtain hooks for each shower curtain grommet.

2.14 SANITARY NAPKIN DISPOSAL:

A. Manufacturer's standard stainless steel surface mounted sanitary napkin disposal as indicated on drawings form one of the following manufacturers:

1. Bradley: Model No. 4A11- partition mounted

2. Bradley: Model No. 4A10- Surfaced mounted

2.15 WALL MOUNTED BABY CHANGING STATION:

A. Provide baby changing station from one of the Manufacturer's listed below:

1. Bradley: Model No. 9611 [Basis of Design]

B. Provide four (4) at the locations indicated on the Drawings

2.16 ADA SHOWER SEATS: [verify if used]

A. Manufacturer's standard surface-mounted folding seat, with 1/2-inch thick ivory colored solid phenolic water-resistant seat attached to Type 304 stainless steel frame and mounting brackets, and self-locking mechanism.

B. Location: As indicated on the Drawings.

1. Provide coordination for all necessary preservative treated concealed wood blocking required for proper and secure mounting, and otherwise as required to provide water-tight installation on surface where indicated to be installed, utilizing same materials and color as recommended in writing by prefabricated shower unit manufacturer.

C. Manufacturer/Model No.:

3. Bradley No. 9569 for L-shaped, as indicated on Drawings.

4. Bradley No. 9562 for Rectangular, as indicated on Drawings.

D. Mounting Height: 18-inches A.F.F. to top of seat in folded-down position.

2.17 SWIMSUIT WATER EXTRACTOR: [verify is used]

A. Provide swimsuit water extractor equal to “Suitemate” www.suitmate.com

1. Size: 15” x 15” x 23”

2. Weight: approx.. 55 lbs.

3. Power requirements: 115-V, 20-Amp 60-Hz Self timed unit

4. Install on wall as directed by manufacturer.

5. Mounting Height: 42 inches AFF

6. Connect to an approved sanitary waste line.

7. Provide Instruction signage.

2.18 FABRICATION:

A. General: Only a maximum 1-1/2-inch diameter, unobtrusive stamped logo of manufacturer, as approved by Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by means of either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

D. Mirror Units, General: Provide mirror backing and support system that will permit rigid, tamper proof glass installation and prevent accumulation of moisture, as follows:

1. Provide galvanized steel backing sheet, not less than 22-gauge (.034-inch) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

E. Mirror Unit Hangers: Provide system of mounting mirror units that will permit rigid, tamper proof, and theft proof installation, as follows:

1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring special tool to remove.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Install toilet accessory units in accordance with manufacturers' current written instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

B. Secure mirrors to walls in concealed, tamper proof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, in accordance with manufacturer's instructions for type of substrate involved.

3.2 ADJUSTING AND CLEANING:

A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

B. Clean and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION 10 28 00

SECTION 10 44 16

FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

1.2 RELATED REQUIREMENTS

A. Section 04 22 00 – "Concrete Unit Masonry".

B. Section 06 10 00 – "Rough Carpentry": Wood blocking product and execution requirements.

1.3 REFERENCE STANDARDS

A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2007.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.4 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate cabinet physical dimensions, wall bracket mounted measurements, and location.

C. Product Data: Provide extinguisher operational features and anchorage details.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.5 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Fire Extinguisher Cabinets and Accessories:

1. Amerex Corp.: www.amerex-fire.com

2. JL Industries, Inc: www.jlindustries.com.

3. Larsen's Manufacturing Co; Product "Architectural Series": www.larsensmfg.com.

4. Potter-Roemer: www.potterroemer.com.

5. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

1. Provide extinguishers labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

B. Dry Chemical Type Fire Extinguishers: Enameled steel tank, with pressure gage.

1. Class B:C.

2. Size 10.

C. Regular Wet Chemical Type (Type "K"): UL Rated 2A:1B:K, 13-pound nominal capacity, in enameled steel container. Mounted on wall bracket in Kitchen areas unless otherwise indicated on the drawings.

D. Provide tag for each extinguisher, which identifies the unit, indicates date charged, and other pertinent data required by authorities having jurisdiction.

E. Provide brackets for fire extinguishers not located in cabinets.

2.3 FIRE EXTINGUISHER CABINETS

A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.

B. Cabinet Configuration: Semi-recessed and surface mounted type, unless shown otherwise.

1. Sized to accommodate accessories and extinguisher.

2. Trim: rolled edge, 2.5 inch wide face.

C. Door: 0.036 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with two butt hinge. Provide nylon catch. Door style equal to Larsens "Vertical Duo" [verify]

D. Door Glazing: Plastic, clear, 1/8 inch thick polycarbonate. Set in resilient channel gasket glazing.

E. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

F. Weld, fill, and grind components smooth.

G. Finish of Cabinet Exterior Trim and Door: Baked enamel, white color.

H. Finish of Cabinet Interior: White enamel.

2.5 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.

B. Cabinet Signage: Red letters: "Fire Extinguisher".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings, see drawings for mounting height; or if not indicated, at height to comply with applicable regulations of governing authorities.

C. Where exact location of cabinets and bracket-mounted fire extinguishers is not indicated, locate as directed by Architect.

D. Secure rigidly in place.

E. Install one fire extinguisher in each fire extinguisher cabinet and bracket.

END OF SECTION 10 44 16

SECTION 10 73 16

CANOPIES

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Work in this section includes furnishing and installation of extruded aluminum canopy.

1.2 RELATED REQUIREMENTS

A. Section 03 30 00 – "Cast-in-Place Concrete

B. Section 04 22 00 – "Concrete Unit Masonary"

C. Section 05 50 00 – "Metal Fabrications"

D. Section 07 62 00 – "Sheet Metal Flashing and Trim"

E. Section 07 90 00 – "Joint Protection"

1.3 REFERENCE STANDARDS

A. Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

C. American Architectural Manufacturer's Association (AAMA).

D. American Society for Testing and Materials (ASTM).

1.4 1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide manufacturer's product information, specifications and installation instructions for building components and accessories.

C. Shop Drawings: Indicate all necessary plan dimensions, elevations and details. General Contractor shall verify all dimensions and provide elevations at each column, finish floor, and related soffit before releasing to manufacturer for fabrication.

D. Certification: Submit design calculations signed by a Registered Professional Engineer, licensed in Alabama. Design calculations shall state that the canopy system complies with the wind requirements of ASCE 7-95, the applicable building code, and all other governing criteria.

E. Warranty: Submit manufacturer's warranty (as described below) and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Perform design under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience, and approved by manufacturer.

D. Wind Uplift: Provide roof and vertical panel systems including supports meeting requirements of Underwriters Laboratories, Inc. for Class 90 wind uplift resistance.

1. Minimum Code Wind Load at Site: 90 mph (IBC 2006).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store all canopy components in protected areas.

1.7 WARRANTY

A. See Section 01 77 00 - Closeout Submittals, for additional warranty requirements.

B. Canopy system, including materials and workmanship, shall be warranted from defects for a period of one year from substantial completion of installation.

C. Provide 10 year manufacturer warranty for canopy system remaining intact (without perceptible deformation) and completely leak-free for 10-years from date of acceptance of project (this warranty need not cover damage from

winds exceeding the velocities and/or loading required by the International Building Code.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Mapes Canopies, 7748 N. 56th Street, Lincoln, NE 68514. Phone 888-273-1132; Fax 877-455-6572. www.mapes.com/canopies

B. Peachtree Protective Covers, Inc., 1477 Rosedale Drive, Hiram, GA 30141. Phone 800-341-3325; Fax 770-439-2122. www.peachtreecovers.com

C. Tennessee Valley Metals, Inc., 2720 Southeastern Circle, Birmingham, AL 35215. Phone 205-853-1125; Fax 205-853-1314. www.tvmetals.com

D. Mason Corporation

E. Mitchell Metals, Phone 770-431-7300; Fax 770-431-7305. www.mitchellmetals.net

F. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 MATERIALS

A. Decking, beams, posts and fascia shall be extruded aluminum, alloy 6063-T6.

B. Fasteners: aluminum, 18-8 stainless steel or 300 series stainless steel.

2.3 COMPONENTS

A. Columns: Columns shall be radius-cornered tubular extrusion of size indicated, with cutout and internal diverter for drainage where required.

B. Beams: Beams shall be open-top tubular extrusion of size and shape indicated, top edges thickened for strength and designed to receive deck members in self-flashing manner. Provide structural ties in tops of all beams.

C. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit.

D. Fascia: Fascia shall be size and shape as indicated.

E. Flashing: Flashing shall be .040" aluminum (min.).

2.4 FABRICATION

A. Columns and gutter beams shall be designed such that the columns will be notched to receive and secure the gutter beams.

B. Beams and Columns shall be positively connected with neatly mitered corners.

C. Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. Assemble deck with sufficient camber to offset dead load deflection.

D. Concealed drainage: Water shall drain from covered surfaces into integral gutter beam and be directed to ground level discharge via one or more designated support posts.

2.5 FACTORY FINISHING

A. Fluoropolymer (Kynar) finish: AAMA 2605, three coat.

B. Color: Selected from manufacturer's full range of colors.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that substrates are ready to receive work.

3.2 PREPARATION

A. Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.3 INSTALLATION

A. Installation shall be in strict accordance with manufacturer's recommendations and approved shop drawings.

B. Column sleeves or blockouts, if required, shall be provided by manufacturer, and installed by General Contractor.

C. Erect columns and beams true to line, level and plumb.

D. Aluminum columns embedded in concrete shall be protected by acrylic.

E. Downspout columns shall be filled with grout to the discharge level to prevent standing water.

F. Non-draining columns shall have weep holes installed at top of concrete to remove condensation.

3.4 CLEANING

A. After installation, entire system shall be left in a clean condition.

3.5 PROTECTION

A. Protect the finish during handling and erection.

B. Take all precautions needed to protect entire canopy system from damage during subsequent construction activity until time of Substantial Completion.

END OF SECTION 10 73 16

SECTION 11 52 13

PROJECTION SCREENS AND PROJECTORS

PART 1-GENERAL

1.1 SUMMARY

A. Section Includes: This Section specifies electrically operated front projection screens and accessories.

1.2 RELATED SECTIONS

A. Division 26 - Common Work Results for Electrical: Power supply, conduit and wiring.

1.3 DEFINITIONS

A. Gain: Indication of screen's luminance or brightness, measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.

B. Viewing Angle: Horizontal angle from perpendicular center of screen at which gain or brightness decreases by 50%.

C. Format: Proportion of projection screen viewing area expressed as a ratio of width/height.

1. NTSC or Video Format: 1.33:1.

1.4 REFERENCES

A. International Code Council (ICC):

1. International Building Code.

B. Society of Motion Picture and Television Engineers (SMPTE):

1. SMPTE RP 94-2000, Gain Determination of Front Projection Screens.

C. Underwriters Laboratories Inc. (UL).

1.5 ACTION SUBMITTALS

A. General: Submit listed action submittals in accordance with Contract Conditions and Division 1

B. Product Data: Submit product data, including manufacturer's technical product data sheet, for specified products.

1. Material Safety Data Sheets (MSDS).

C. Shop Drawings: Indicate dimensions, fabrication and installation details.

1. Include electric wiring diagrams.

D. Samples: Submit [2] samples of screen finish material having dimensions of [6 inches × 6 inches (152 × 152 mm)].

1.6 INFORMATION SUBMITTALS

A. Quality Assurance:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

2. Certificates: Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics, criteria and physical requirements.

3. Manufacturer's installation instructions.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit for products in accordance with Section 01 77 00 - Closeout Submittals. Include:

1. Manufacturer's instructions detailing maintenance requirements.

2. Parts catalog that includes complete list of repair and replacement parts, with cuts and identifying numbers.

1.8 QUALITY ASSURANCE

A. Qualifications:

1. Worker experienced in performing work of this section who has specialized in work similar to that required of this project.

B. Regulatory Requirements:

1. Comply with International Building Code (IBC).

C. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements and manufacturer's instructions. Comply with Division 1 - Project Meetings.

1.9 DELIVERY, STORAGE & HANDLING

A. Storage and Protection:

1. Store electric projection screens in a dry, ventilated area, protected from exposure to harmful weather conditions, at a temperature less than 80 degrees F (27 degrees C).

B. Handling: Handle electrically operated projection screen materials with care in order to prevent damage.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1.10 PROJECT AMBIENT CONDITIONS

A. Project Location: Perform electrically operated projection screen work when temperatures are greater than 40 degrees F (4 degrees C).

1.11 SEQUENCING

A. Sequence with Other Work: Comply with projection screen manufacturer's written recommendations for sequencing construction operations.

1.12 WARRANTY

A. Project Warranty: Refer to Contract Conditions for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.

C. Warranty: Commencing on date Substantial Completion

1.13 MAINTENANCE MATERIALS

A. Use standard product line parts produced by manufacturer of electrically operated projection screens.

PART 2-PRODUCTS

2.1 MANUFACTURERS

A. Ensure manufacturer has minimum [5] years' experience manufacturing components similar to or exceeding project requirements.

B. Manufacturer: Da-Lite Screen Company, Inc.

1. Contact: P.O. Box 137, 3100 N. Detroit St., Warsaw, IN 46581-0137; Telephone: (800) 622-3737, (574) 267-8101; Fax: (877) 325-4832, (574) 267-7804; E-mail: info@da-lite.com; website: www.da-lite.com.

2.2 REQUIREMENTS

A. Type 1: Wall Mounted Electrically Operated Projection Screen Systems.

1. Screen Operation: Electrically operated, UL and ULC listed, retractable, with rigid metal roller and tab guide cable screen tensioning system.

2. Motor: Housed inside metal roller. Includes automatic thermal overload protection, integral gears, capacitor and electric brake to prevent coasting, and preset, adjustable limit switches to automatically stop viewing surface in the UP or DOWN positions.

a. Type: 3-wire, permanently lubricated, reversal type designed for mounting inside roller and to suit project requirements.

b. Voltage, Frequency: 115 V, 60 Hz.

c. Amperage: 2.4 amps maximum.

3. Electric Controls: Wall mounted switch with integral junction box incorporated into screen housing.

a. Voltage, Frequency: 115 V, 60 Hz.

b. Switch: 3 position type with cover plate for UP, DOWN and STOP functions.

4. Screen Mounting: Wall

    a. Include mounting hardware and roller mounting brackets that adjust to allow centering or offsetting of the screen within the case.

5. Screen Case: Designed to receive mounting hardware and sized to suit projection screen.

    a. Material: Extruded aluminum.

    b. Design: 2-piece with curved contour flat-backed style with heavy-duty end caps concealing roller ends.

    c. Length: 137-1/4" Overall Case length

    d. Finish:

        1) Case Front: Powder coated black.

6. Screen Size:

    a. Viewing Area: H 57.5 inches × W 92 inches

7. Basis of Design: Da-Lite Screen Company, Inc. Tensioned Contour Electrol Projection Screen.

    a. Tab Guide Cable Tensioned Screen Material:

        1) Front projection, flame retardant, mildew resistant vinyl, [with] [without] black backing and [with] [without] standard black borders, easily cleaned with mild soap and water solution.

        2) Include tab and cable guide on each side of fabric to maintain even, lateral tension and hold viewing surface flat.

        3) Bottom end of fabric to be inserted into a custom aluminum slat bar with added weight to provide vertical tension on the screen surface.

        4) Slat ends to be protected by heavy-duty plastic caps enclosing a preset adjustable mechanism for screen tensioning.

        5) Seamless in all sizes.

    b. Gain: To SMPTE RP 94-2000, 1.0

    c. Viewing Angle: 25

d. Format: NTSC or Video - 1.33:1

e. Acceptable Viewing Surface: Da-Lite Screen Company, Inc.:

1) Da-Mat.

2) Cinema Vision.

3) Pearlescent.

4) High Contrast Cinema Vision.

2.3 ACCESSORIES

A. Screen Drop: Standard, per Manufacturer

Specifier Note: Refer to manufacturer's technical data sheets and retain or delete paragraphs and subparagraphs below to suit project requirements.

B. Low Voltage Control (LVC) System:

1. Single Motor Low Voltage Control (LVC) System: Internal.

a. Wireless Remote Control for LVC: Infrared 3-button handheld remote control for UP, DOWN and STOP functions with single motor, low voltage control unit.

C. Silent Motor with Integrated Low Voltage Control System (LVC).

D. Key Locking Cover Plate: Hinged cover plate with brushed stainless-steel finish provides keyed access to LVC wall switch.

E. Serial Control Board:

1. SCB-200 RS-232: Built-in with IR-200 Infrared Remote.

F. Installation Hardware: Fasteners and other components of type, size and spacing recommended by manufacturer for complete, functional and secure installation of electric screen.

2.4 PRODUCT SUBSTITUTIONS

A. Substitutions: In accordance with Division 1 - Product Substitution Procedures

2.5 PROJECTOR

A. Dukane Imagepro 6647WU LCD Projector – or preapproved equal.

1. Tie off to all four corners.

2. 4700 Lumen

3. 1920 x 1200 WUXGA Resolution

4. Power Requirements: 100-240V AC, 50/60Hz

5. Contrast Ratio: 10,000:1

6. Remote mouse control with 3-year warranty

7. Furnish with video cable in length as required to reach wall/or ceiling outlet.

PART 3-EXECUTION

3.1 INSTALLERS

A. Provide experienced and qualified technicians to install electrically operated projection screens.

3.2 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and Manufacturer technical data sheets.

3.3 EXAMINATION

A. Site Verification of Conditions:

1. Verify that conditions of substrates previously installed under other sections or contracts are acceptable with electrically operated projection screen installation.

2. Ensure electrical power supply is installed to meet electric projection screen requirements in accordance with Section [26 05 00 - Common Work Results for Electrical].

a. Verify type and location of power supply.

3. Inform Architect and General Contractor of unacceptable conditions immediately upon discovery.

4. Proceed with installation only after unacceptable conditions have been corrected.

3.4 COORDINATION

A. Coordinate electric projection screen placement with placement of other ceiling and wall mounted components.

3.5 INSTALLATION

A. Install electric projection screens in accordance with reviewed shop drawings at locations and heights indicated.

B. Install screen housing and make electrical connections in conjunction with installation of ceiling system.

1. Verify locations with Architect prior to installation.

C. Install viewing surface and drive assembly in housing only after interior construction is substantially complete.

D. Securely install screens plumb and level to supporting substrate.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Have manufacturer's technical representative schedule site visits to review work as follows:

1. Upon completion of work, after cleaning is carried out.

B. Testing and Inspection: Operate each screen [3] times to ensure viewing surfaces extend and retract through full range of motion.

1. Verify controls, limit switches, and other components function as designed and meet project requirements.

2. Ensure viewing surface raising operation fully engages and lifts screen closure door into closed position.

3. Adjust motors, controls and components to allow for smooth, unobstructed screen operation.

3.7 FINAL CLEANING

A. Perform cleanup in accordance with Division 1

B. Upon completion, remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

A. Protect electrically operated projection screens from damage during construction in accordance with Division 1.

B. Repair damage to adjacent materials caused by electrically operated projection screen work.

3.9 MAINTENANCE

A. Perform work during regular trade working hours satisfactory to Owner.

END OF SECTION 11 52 13

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SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated roller shades with dual rollers.

B. Related Requirements:

1. Section 061000 Rough Carpentry for wood blocking and grounds for mounting roller shades and accessories.
2. Section 079200 "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples: For each exposed product and for each color and texture specified, 10 inches long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 3 inches square. Mark interior face of material if applicable.
2. Installation Accessories: Full-size unit, not less than 10 inches long.

F. Product Schedule: For roller shades: RS-1.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material.

C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

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. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from

Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH DUAL SHADE ROLLERS

A. Basis of Design: Draper, Inc.

B. Approved additional manufacturers:
   1. Solarfective by LaGrand
   2. Mecho

C. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

   1. Bead Chains: Stainless steel

      a. Loop Length: Full length of roller shade.
      b. Limit Stops: Provide upper and lower ball stops.
      c. Chain-Retainer Type: Clip, jamb mount

   2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.

      a. Provide for shadebands that weigh more than 10 lb for shades as recommended by manufacturer, whichever criterion is more stringent.

D. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

   1. Roller Drive-End Location: Right side of interior face of shade.
   2. Direction of Shadeband Roll: Reverse, from front (interior face) of roller.
   3. Shadeband-to-Roller Attachment: Manufacturer's standard method

E. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

F. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

G. Shadebands:

1. Shadeband Material: See Finish Schedule.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

    a. Type: Enclosed in sealed pocket of shadeband material.
    b. Color and Finish: See Finish Schedule

H. Black Out Layer:

1. Shadeband Material: See Finish Schedule
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

    a. Type: Enclosed in sealed pocket of shadeband material.
    b. Color and Finish: See Finish Schedule

I. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.

    a. Shape: L-shaped
    b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 3 inches

2. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.

    a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 3 inches.

3. Endcap Covers: To cover exposed endcaps.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.

1. Source: Basis of Design: Draper, Inc.
2. Type: 25% Polyester, 75% Vinyl Polyester
3. Thickness: .037 in.
4. Weight: 20.7 oz/yd2
5. Roll Width: maximum possible; seams to align with window framing
6. Openness Factor: 10 percent.
7. Color: As indicated on Drawings

C. Black Out Fabric: PVC Composition, opaque fabric

1. Source: Basis of Design: Draper, Inc.
2. Type: 100% Polyester with Acrylic Coating
3. Thickness: .016 in.
4. Weight: 12.14 oz/yd2
5. Roll Width: maximum possible; seams to align with window framing
6. Openness Factor: Opaque
7. Color: As Indicated on Drawings

2.4 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
2. Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along

shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

2. Skylight Shades: Provide battens and seams at uniform spacings along shadeband as required to ensure shadeband tracking and alignment through its full range of movement without distortion or sag of material.
3. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

C. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION 12 24 13

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SECTION 12 36 23.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Section 06 41 16 – "PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS"

1.2 SUMMARY

A. Section includes plastic-laminate countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products high-pressure decorative laminate adhesive for bonding plastic laminate.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of cutouts and holes for plumbing fixtures faucets and other items installed in plastic-laminate countertops.

C. Samples for Color Verification:

1. Plastic laminates as specified on the Finish Schedule

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For the following:
1. High-pressure decorative laminate.
2. Adhesives.

B. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops 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 countertops 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 43 and 70 percent during the remainder of the construction period.

C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, 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 those selections and requirements in addition to the quality standard.

B. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

C. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute.

D. Edge Treatment: Same as laminate cladding on horizontal surfaces.

E. Core Material: Particleboard or medium-density fiberboard.

F. Core Material at Sinks: Particleboard made with exterior glue or exterior-grade plywood.

G. Core Thickness: 3/4 inch (19 mm).

1. Build up countertop thickness to 1-1/2 inches (38 mm) at front, back, and ends with additional layers of core material laminated to top.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

2.3 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch (51-mm) OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Products: Subject to compliance with requirements, provide the following:

a. Doug Mockett & Company, Inc.; OG Series. Or approved equal

2.4 MISCELLANEOUS MATERIALS

A. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.

B. Complete fabrication, including assembly, 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. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. 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.
2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c. and to walls with adhesive.
3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 12 36 23.13

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SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.
3. Solid surface material end splashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches (150 mm) square.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS (SS-2, SS-3 AND SS-4)

A. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute

B. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS

1. See Finish Schedule

C. Countertops: 1/2-inch-thick, solid surface material with front edge built up with same material, unless otherwise indicated.

D. Backsplashes & Endsplashes: 1/2-inch-thick, solid surface material, unless otherwise indicated.

E. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

F. Joints: Fabricate countertops in sections for joining in field.

1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.

G. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.
b. Provide vertical edges, rounded to 3/8-inch (10-mm) radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch (5 mm) into fixture opening.
c. Provide 3/4-inch (20-mm) full bullnose edges projecting 3/8 inch (10 mm) into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings and similar items.

2.2 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Install backsplashes and endsplashes to comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

D. Seal edges of cutouts in particleboard subtops by saturating with varnish.

E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

G. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

SECTION 123661.19 – QUARTZ SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Quartz material countertops.
2. Quartz material backsplashes.
3. Quartz material end splashes.
4. Quartz Circulation Desk Panel

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

C. Samples for Initial Selection: For each type of material exposed to view.

1. Countertop material, 6 inches (150 mm) square for each product indicated.

1.3 CLOSEOUT SUBMITTALS

Maintenance Data: For quartz surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops certified by the manufacturer.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 QUARTZ SURFACE COUNTERTOP MATERIALS (SS-1 AND SS-5)

A. BASIS OF DESIGN PRODUCT: Subject to compliance with requirements, provide products indicated on Drawings in the Finish Materials Legend or an approved substitute.

B. Homogeneous mixture containing 93% pure quartz with additions of high performance polyester resin, pigments and special effects.

C. Countertops: 2 cm-thick, quartz surface material with front edge built up with same material, unless otherwise indicated.

D. Backsplashes & Endsplashes: 3 cm-thick, quartz surface material , unless otherwise indicated.

E. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

F. Fabricate with loose backsplashes for field assembly.

G. Joints: Fabricate countertops in sections for joining in field.

1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.

H. Cutouts and Holes:

1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves with polished edges.

a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.

b. Provide vertical edges, rounded to 3/8-inch (10-mm) radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16 inch (5 mm) into fixture opening.

c. Provide 3/4-inch (20-mm) full bullnose edges projecting 3/8 inch (10 mm) into fixture opening.

2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings and similar items.

2.2 INSTALLATION MATERIALS

B. Adhesive: Epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use .

C. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive quartz material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install materials in accordance with manufacturer's instructions and approved shop drawings.

B. Preliminary Installation:

1. Position materials to verify the correct size.

2. If size adjustments, or additional fabrication is necessary, use water cooled tools. Protect jobsite and surface from dust and water . Perform work away from installation site if possible.

3. Allow gaps for expansion of not less than 1/8 inch(1.5mm) per ten feet when installed between walls or other fixed structure.

C. Permanent Installation:

1. After verification of fit and finish, clean substrate; remove loose and foreign matter which may interfere with adhesion. Clean quartz surface backside & joints with denatured alcohol.

2. Horizontal surface: Apply continuous bead of mounting adhesive around perimeter of structural substrate and supports.

3. Vertical surface: Apply continuous bead of mounting adhesive around perimeter. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.

4. Install quartz surfacing plumb, level, square and flat to within 1/8 inch in ten Feet, non-cumulative.

6. Align adjacent pieces in same plane.

D. Joints:

1. Joints Between Adjacent Pieces of Quartz Surfacing:

   a. Joints shall be flush, tight fitting, level and neat.
   b. Securely join adjacent pieces with Manufacturer approved Acrylic Adhesive.
   c. Fill joints level to polished surface.
   d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.

3.3 CLEANING

A. Remove masking, excessive adhesive and sealants. Clean exposed surfaces with denatured alcohol.

3.4 PROTECTION

A. Protect installed fabrications with non-staining sheet coverings.

END OF SECTION 12 36 61.19

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