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ADDITION AND RENOVATION

PACKAGE D – ADDITION AND RENOVATION

The University of Alabama, Tuscaloosa, Alabama

UA Project No.: 560-23-2688D / 91209
KPS Project No.: 236002-02
DCM No.: 2023453

Bid Set – Vol. 1
January 30, 2024



STATE OF ALABAMA
KPS GROUP, INC.
3531
By DONALD C. SIMPSON
REGISTERED ARCHITECT

K|P|S
GROUP
Architecture Interior Design Planning Urban Design
60 14th Street South, Suite 100, Birmingham, Alabama 35233
Tel (205) 251-0125 · kpsgroup.com ·

DOCUMENT 00 01 07

PROFESSIONAL SEALS

ARCHITECT **The following Sections:** Divisions 00 - 33 Sections, except where indicated as prepared by other design professionals of record, were prepared by **KPS Group, Inc.**	(Architect's Seal is located on Front Cover)
CIVIL ENGINEER The following Sections were prepared by **Duncan Coker Associates:** **01 20 20** UTILITY SURVEYS BY CONTRACTOR **02 21 02** EXISTING UTILTIES **02 41 16** SITE DEMOLITION **31 10 00** SITE CLEARING **31 20 00** EARTH MOVING **31 21 00** TRENCHING BACKFILL COMPACTION OF UTILITY TRENCHES **32 12 17** MILLING OF EXISTING ASPAHLT PAVING **32 12 20** CRUSHED AGGREGATE BASE **32 13 13** CONCRETE PAVING **32 13 20** CONCRETE CURB, GUTTER, AND SIDEWALKS **32 22 90** EROSION CONTROL **32 30 00** CAST-IN-PLACE CONCRETE (CIVIL) **32 70 00** PAINTING AND STRIPING **32 91 10** TOPSOIL AND SUBGRAGE PREPARATION IN LANDSCAPE AREAS **32 91 13** SOIL PREPARATION **32 93 01** TREE PROTECTION **33 24 33** REINFORCED CONCRETE PIPE **33 24 34** POLYPROPYLENE STORM SEWER PIPE **33 26 00** DUCTILE IRON PIPE AND FITTINGS **33 26 01** HDPE WATER PIPE AND FITTING **33 26 05** PRECAST CONCRETE MANHOLES **33 26 60** WATER SYSTEM **33 26 62** GATE VALVES **33 26 64** VALVE BOX AND VAULT **33 26 67** SERVICE CONNECTIONS **33 26 68** FIRE HYDRANTS **33 26 70** BACKFLOW PREVENTION **33 27 22** GRAVITY SANITARY SEWER SYSTEM **33 27 29** THRUST RESTRAINT	

END OF DOCUMENT

DOCUMENT 00 01 07

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ARCHITECT **The following Sections:** Divisions 00 - 33 Sections, except where indicated as prepared by other design professionals of record, were prepared by **KPS Group, Inc.**	(Architect's Seal is located on Front Cover)
STRUCTURAL ENGINEER The following Sections were prepared by **MBA Engineers, Inc.:** **01 41 00** SPECIAL INSPECTIONS **03 30 00** CAST-IN-PLACE CONCRETE **05 12 00** STRUCTURAL STEEL FRAMING **05 31 00** STEEL DECK **31 66 15** HELICAL FOUNDATION PILES	

END OF DOCUMENT

DOCUMENT 00 01 07

PROFESSIONAL SEALS

ARCHITECT

The following Sections:

Divisions 00 - 33 Sections, except where indicated as prepared by other design professionals of record, were prepared by **KPS Group, Inc.**

(Architect's Seal is located on Front Cover)

MECHANICAL ENGINEER

The following Sections were prepared by **HHB Engineers, PC:**



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23 81 27	BLOWER COIL UNITS
23 82 19	FAN COIL UNITS
23 82 39.19	WALL AND CEILING UNIT HEATERS

Continued…

MECHANICAL ENGINEER

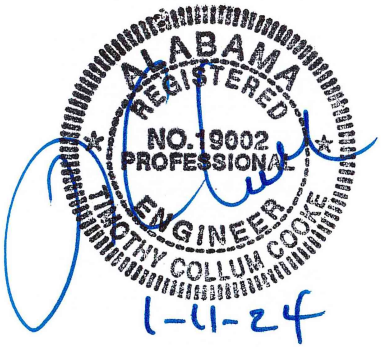
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END OF DOCUMENT

DOCUMENT 00 01 07

PROFESSIONAL SEALS

ARCHITECT **The following Sections:** Divisions 00 - 33 Sections, except where indicated as prepared by other design professionals of record, were prepared by **KPS Group, Inc.**	(Architect's Seal is located on Front Cover)
ELECTRICAL ENGINEER The following Sections were prepared by **Jackson Renfro & Associates, Inc.:** **26 05 00** BASIC ELECTRICAL MATERIALS AND METHODS **26 05 19** POWER CONDUCTORS AND CABLES 51V-600V **26 05 26** GROUNDING **26 05 33** RACEWAYS **26 05 34** OUTLET BOXES, JUNCTION BOXES, WIREWAYS **26 05 53** ELECTRICAL IDENTIFICATION **26 05 73** POWER DISTRIBUTION SYSTEM ELECTRICAL STUDIES **26 09 43** LIGHTING CONTROL SYSTEM **26 09 44** DISTRIBUTED DIGITAL LIGHTING MANAGEMENT SYSTEM **26 24 16** POWER PANELBOARDS - CIRCUIT BREAKER TYPE **26 24 17** LIGHTING PANELBOARDS **26 27 13** ELECTRICAL METERING **26 27 26** WIRING DEVICES **26 28 13** FUSES **26 28 16** SAFETY SWITCHES AND FUSES **26 32 13** GENERATOR SETS **26 36 23** AUTOMATIC TRANSFER SWITCHES **26 36 33** GENERATOR LOAD BANK DOCKING STATION **26 41 00** LIGHTNING PROTECTION SYSTEM **26 43 00** SURGE PROTECTIVE DEVICES **26 50 00** LIGHTING MATERIALS AND METHODS **27 05 00** AUXILIARY SYSTEM CABLES, 0-50V **28 31 00** FIRE ALARM SYSTEM	

END OF DOCUMENT

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PROFESSIONAL SEALS

ARCHITECT **The following Sections:** Divisions 00 - 33 Sections, except where indicated as prepared by other design professionals of record, were prepared by **KPS Group, Inc.**	(Architect's Seal is located on Front Cover)
LANDSCAPE ARCHITECT The following Sections were prepared by **Renta Urban Land Design:** **32 13 13** CONCRETE PAVING **32 14 00** UNIT PAVING **32 84 00** PLANTING IRRIGATION **32 91 13** SOIL PREPARATION **32 92 00** TURF AND GRASSES **32 93 00** PLANTS	 11 JAN 2024

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ADVERTISEMENT FOR BIDS

Sealed Bid Proposals will be received by Construction Administration, The University of Alabama, at the Procurement Services Annex, 405 Cahaba Circle, Tuscaloosa, AL 35404, **Tuesday, February 20, 2024 until 2:00 PM local time** for construction of the **McLure Library Addition and Renovation, UA Project #051-23-2688D**, at which time they will be opened and read.

General Contractors are required to prequalify prior to requesting Bid Documents. For information on how to prequalify for this project, please **go to** UAbidinfo.ua.edu **and click on this project in the list of projects shown**. Prequalification submissions must be received by **5:00 PM local time Tuesday, January 23, 2024. Late submittals will not be accepted**.

A **mandatory pre-bid conference** for General Contractors will be held at the Conference Room of the Procurement Services Annex at the above address at **9:00 AM local time Tuesday, January 30, 2024** and continue on to the job site.

Preliminary Drawings and Specifications—are open to public inspection and will be available for **EXAMINATION ONLY** starting **Monday, January 15, 2024,** at The University of Alabama, Office of Construction Administration Plan Room, 1115 14th Street, Ancillary Services Building, Second Floor, Tuscaloosa, AL 35401. Final plans, specifications, and contract documents will be available for **EXAMINATION ONLY** at this same location starting **Tuesday, January 30, 2024**.

Final plans, specifications, and contract documents will be available for Printing and/or Examination on **Tuesday, January 30, 2024**. For information on obtaining plans, specifications, and contract documents go to UAbidinfo.ua.edu or contact **Richard Pitts** at **KPS Group, Inc. , 205-458-3237** .

For questions regarding this project, please contact UA Project Manager **Mary Kathryn Holt** at **256-710-5834** or **zickl001@ua.edu**.

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The Contract Documents may contain modifications of, or supplements to, these Instructions to Bidders effecting additional procedures or requirements applicable to this particular project.

1. INTENT OF INSTRUCTIONS:

Instructions to Bidders are included in the Contract Documents to amplify the abbreviated Advertisement and to give other details that will allow interested parties to prepare proper bids. Modifications may be added.

2. BIDDER QUALIFICATIONS:

a. When the amount bid for a contract exceeds the amount established by the State Licensing Board for General Contractors, the bidder must be licensed by that board and must show the Designer evidence of license before bidding or the bid will not be received by the Designer or considered by the Awarding Authority. A bid exceeding the bid limit stipulated in the bidder's license, or which is for work outside of the type or types or work stipulated in the bidder's license, will not be considered. In case of a joint venture of two or more contractors, the amount of the bid shall be within the maximum bid limitation as set by the State Licensing Board for General Contractors of the combined limitations of the partners to the joint venture. Requirements in Article 6 of these Instructions to Bidders related to a bidder's state license for general contracting apply when a bid exceeds the amount currently established by the State Licensing Board for General Contractors. See Chapter 8, Title 34, Code of Alabama (1975).

b. Any special qualifications required of general contractors, subcontractors, material suppliers, or manufacturers are set forth in the bid documents.

c. The Awarding Authority may have elected to prequalify bidders. Parties interested in bidding for this contract are directed to the Advertisement for Bids, PQ & Plans, and Supplemental Instructions to Bidders to determine whether bidders must be prequalified and how they may obtain copies of the Awarding Authority's published prequalification procedures and criteria.

d. Release of bid documents by the Designer to a prospective bidder will not constitute any determination by the Awarding Authority or Designer that the bidder has been found to be qualified, prequalified, or responsible.

e. In compliance with Act 2016-312, as codified in Alabama Code section 41-16-5, by submitting a bid for this project the bidder certifies that it is not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

(If this project is federally funded in whole or in part, the next two paragraphs shall not apply.)

f. In awarding the Contract, preference will be given to Alabama resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the Contract only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances.

g. A nonresident bidder is a contractor which is neither (a) organized and existing under the laws of the State of Alabama, nor (b) maintains its principal place of business in the State of Alabama. A nonresident contractor which has maintained a permanent office within the State of Alabama for at least five continuous years shall not thereafter be deemed to be a non-resident contractor so long as the contractor continues to maintain a branch office within Alabama.

3. COPIES OF CONTRACT DOCUMENTS:

Copies of the Contract Documents may be obtained by prime contractor bidders from the Awarding Authority or their Agent upon payment of the deposit (plus postage if delivered by mail) as stated in the Advertisement for Bids and/or the PQ & Plans document. Deposits will be returned to all depositors upon return of all documents in reusable condition within ten (10) days after bid opening. Additional sets for prime contractor bidders, subcontractors, vendors or dealers may be obtained upon payment of the same deposit. The deposit shall be refunded less the cost of printing, reproduction, handling and distribution upon return of the documents in reusable condition within ten (10) days after bid opening. The following Plan Rooms will be furnished Contract Documents without payment of a deposit or fee provided they agree to return the documents in reusable condition: Tuscaloosa Blueprinting and Reprographics LLC, 1926 University Blvd., Tuscaloosa, Alabama 35401; ConstructConnect, 30 Technology Parkway South, Suite 100, Norcross, GA, 30092; and Dodge Data & Analytics at network.construction.com.

4. EXAMINATION OF CONTRACT DOCUMENTS AND OF THE SITE OF THE WORK:

a. Before submitting a bid for the Work, the bidders shall carefully examine, read, and study the Bid Proposal and Contract Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site, and any other work being performed thereon at the time of submission of their bids.

b. Bidders shall fully inform themselves as to transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area which will have a bearing on the performance of the Work for which they submit their bids. By submission of a bid bidder acknowledges that bidder examined the Contract Documents and found them to be complete, accurate adequate, consistent, coordinated and sufficient for construction and visited the site and has judged for and satisfied himself as to conditions to be encountered regarding the character, difficulties, quality, and quantities of work to be performed and the material and equipment to be furnished, the Awarding Authority's tax exempt status, and as to the contract requirements and contingencies involved. The Awarding Authority makes no representation or warranty of any nature whatsoever to bidders concerning the Contract Documents.

5. EXPLANATIONS AND INTERPRETATIONS:

a. Before submitting a bid, bidders shall carefully examine, read, and study the Bid Proposal and Contract Documents.

b. Should any bidder observe any ambiguity, inconsistency, conflict, discrepancy, omission, or error in the Drawings and Specifications, or in any of the other Contract Documents, or be in doubt as to the intention and meaning thereof, the bidder shall immediately report such to the Designer and request clarification.

c. Clarifications will be made only by written Addenda, which will be sent to all prospective bidders and plan holders. Neither the Awarding Authority nor the Designer will be responsible for verbal answers or instructions regarding intent or meaning of the Contract Documents.

d. Should a conflict, inconsistency, ambiguity, omission, or error occur in or between the Drawings and the Specifications, a bidder will be deemed to have based its bid on the better quality or greater quantity of doing the work involved unless prior to submission to their bid, the bidder shall have asked for and obtained the written decision or clarification from the Designer as to the correct quantity, quality, method, materials, equipment etc. which will be required to perform the Work.

6. **SUBSTITUTIONS:**

Whenever a product, material, system, item of equipment, or service is identified in the Contract Documents by reference to a trade name, manufacturer's name, model number, etc. and only one or two sources are listed, or three or more sources are listed and followed by "or approved equal" or similar wording, it is intended to establish a required standard of performance, design, and quality, and the Contractor may submit, for the Designer's approval, products, materials, systems, equipment, or services of other sources which the Contractor can prove to the Designer's satisfaction are equal to, or exceed, the standard of performance, design and quality specified, unless the provisions of the final paragraph below apply. Such proposed substitutions are not to be purchased or installed without the Designer's written approval of the substitution.

If the Contract Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the Contractor must furnish the identified sole source.

7. **PREPARATION OF BIDS:**

a. Proposal Form:

(1) Bids must be submitted on the Proposal Form as contained in the bid documents, always use the latest form provided during the bid process.

(2) All information requested of the bidder on the Proposal Form must be filled in.

(3) Identification of Bidder: On the first page of the Proposal Form the bidder must be fully identified by completing the spaces provided for:

(a) the legal name of the bidder,

(b) the state under which laws the bidder's business is organized and existing,

(c) the city (and state) in which the bidder has its principal offices,

(d) the bidder's business organization, i.e., corporation, partnership, or individual (to be indicated by marking the applicable box and writing in the type of organization if it is not one of those listed), and

(e) the partners or officers of the bidder's organization, if the bidder is other than an individual. If the space provided on the Proposal Form is not adequate for this listing, the bidder may insert "See Attachment" in this space and provide the listing on an attachment to the Proposal Form.

(4) Where indicated by the format of the Proposal Form, the bidder must specify lump sum prices in both words and figures. In case of discrepancy between the prices shown in words and in figures, the words will govern.

(5) All bid items requested in the Proposal Form, including alternate bid prices and unit prices for separate items of the Work, must be bid. If a gross sum of bid items is requested in the Proposal Form, the gross sum shall be provided by the bidder.

(6) In the space provided in the Proposal Form under "Bidder's Alabama License", the bidder must insert his or her current general contractor's state license number, current bid limit, and type(s) of work for which bidder is licensed.

(7) The Proposal Form shall be properly signed by the bidder. If the bidder is:

(a) an individual, that individual or his or her "authorized representative" must sign the Proposal Form;

(b) a partnership, the Proposal Form must be signed by one of the partners or an "authorized representative" of the Partnership;

(c) a corporation, the president, vice-president, secretary, or "authorized representative" of the corporation shall sign and affix the corporate seal to the Proposal Form.

As used in these Instructions to Bidders, "authorized representative" is defined as a person to whom the bidder has granted actual authority, or who has apparent authority, to conduct business in the bidder's behalf by signing and/or modifying the bid.

(8) Interlineation, alterations or erasures on the Proposal Form must be initialed by the bidder or its "authorized representative".

(9) Estimated sales tax shall be included on the designated line(s) on the bid proposal form.

b. Bid Guaranty

(1) The Proposal Form must be accompanied by a cashier's check, drawn on an Alabama 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 Awarding Authority.

(2) If a Bid Bond is provided in lieu of a cashier's check, the bond shall be on the Bid Bond form as stipulated in the bid documents.

(3) The amount of the cashier's check or Bid Bond shall not be less than five percent of the Awarding Authority's estimated cost of the Work or of the Contractor's bid, but is not required to be in an amount more than ten thousand dollars unless otherwise specified for a specific project in the contract documents.

8. COMBINATION BIDS OR PROPOSALS:

If the Awarding Authority so elects, Bid Proposal Forms may be issued for projects or parts of projects in combination or separately. In any case, bidders must adhere to the Bidding Procedures as set forth in the Bid Documents. Award or awards will be made to the lowest responsible and responsive bidder or bidders strictly in accordance with prescribed bidding procedures.

9. TIME FOR COMPLETION:

The time for completion for the Work is specified in the Summary of the Work in the Specifications or by addendum.

10. DELIVERY OF BIDS:

a. Bids will be received until the time set, and at the location designated, in the Advertisement for Bids unless notice is given of postponement. No bid will be accepted or considered which has not been received prior to the time set for opening bids.

b. Each bid shall be placed, together with the bid guaranty, in a sealed envelope. On the outside of the envelope the bidder shall write in large letters "Proposal", below which the bidder shall write the name of the Work bid on, the name of the bidder, and the bidder's current general contractor's state license number. Failure to include the bidder's Alabama General Contractor's license number on the outside of the bid envelope will result in returning the envelope unopened.

c. Bids may be delivered in person or by mail if ample time is allowed for delivery. When sent by mail, preferably special delivery or registered, the sealed envelope containing the bid, marked as indicated above, shall be enclosed in another envelope for mailing. Bidder bears the sole responsibility for ensuring that its bid is delivered to the place and prior to the submission deadline specified in the Advertisement for Bids.

11. WITHDRAWAL OR REVISION OF BIDS:

a. A bid may be withdrawn prior to the time set for opening of bids, provided a written request to withdraw its bid, executed by the bidder or the bidder's "authorized representative", is filed with the Awarding Authority prior to that time. If a timely request to withdraw bid is received, the bid will then be returned to the bidder unopened.

b. A bid which has been sealed in its delivery envelope may be revised by writing the amount of the change in price on the outside of the delivery envelope over the signature of the bidder or the bidder's "authorized representative" if done so prior to the time set for opening bids. In revising the bid in this manner, the bidder must only write the amount of the change in price on the envelope and **must not reveal the bid price**.

c. Written communications, signed by the bidder or its "authorized representative", to revise bids will be accepted if received by the Awarding Authority prior to the time set for opening bids. The Awarding Authority will record the instructed revision upon opening the bid. Such written communication may be by email, letter, or facsimile. In revising the bid in this manner, the bidder must only write the amount of the change in price and **must not reveal the bid price**.

d. Except as provided in Article 13 of these Instructions to Bidders, no bid shall be withdrawn, modified, or corrected after the time set for opening bids.

12. OPENING OF BIDS:

Bids will be opened and read publicly at the time and place indicated in the Advertisement for Bids. Bidders or their authorized agents are invited to be present.

13. IRREGULAR PROPOSALS:

Bids may be rejected if they are incomplete or contain any uninitialed alterations or erasures, additions, conditional bids, alternate bids unless called for, or irregularities of any kind.

14. ERRORS IN BID:

a. Errors and Discrepancies in the Proposal form

In case of error in the extension of prices in bids, the unit price will govern. In case of discrepancy between the prices shown in the figures and in words, the words will govern.

b. Mistakes within the Bid

If the low bidder discovers a mistake in its bid, the low bidder may seek withdrawal of its bid without forfeiture of its bid guaranty under the following conditions:

(1) Timely Notice: The low bidder must notify the Awarding Authority and Designer in writing, within three working days after the opening of bids, that a

mistake was made. This notice must be given within this time frame whether or not award has been made.

(2) Substantial Mistake: The mistake must be of such significance as to render the bid price substantially out of proportion to the other bid prices.

(3) Type of Mistake: The mistake must be due to calculation or clerical error, an inadvertent omission, or a typographical error which results in an erroneous sum. Mistakes of law, judgment, or opinion are specifically excluded from these criteria.

(4) Documentary Evidence: Clear and convincing documentary evidence of the mistake must be presented to the Awarding Authority and the Designer as soon as possible, but no later than three working days after the opening of bids.

The Awarding Authority's decision regarding a low bidder's request to withdraw its bid without penalty shall be made within 10 days after receipt of the bidder's evidence. Upon withdrawal of bid without penalty, the low bidder shall be prohibited from:

(1) Doing work on the project as a subcontractor or in any other capacity.

(2) Bidding on the same project if it is re-bid.

15. DISQUALIFICATION OF BIDDERS:

Any bidder(s) may be disqualified from consideration for contract award for the following reasons:

a. Collusion:

Any agreement or collusion among bidders or prospective bidders in restraint of freedom of competition to bid at a fixed price or to refrain from bidding or otherwise shall render the bids void and shall cause the bidders or prospective bidders to be disqualified from submitting further bids to the Awarding Authority on future lettings. (See Code of Alabama Section 39-2-6 for possible criminal sanctions).

b. Advance Disclosure:

Any disclosure in advance of the terms of a bid submitted in response to an Advertisement for Bids shall render the proceedings void and require re-advertisement and re-bid.

c. Failure to Settle Other Contracts:

The Awarding Authority may reject a bid from a bidder who has not paid, or satisfactorily settled, all bills for labor and material on other contracts in force at the time of letting, completion of punch list, warranties and closeout documents.

16. CONSIDERATION OF BIDS:

After the bids are opened and read publicly, the bid prices will be compared and the results of such comparison will be available to the public. Until the final award of the Contract, however, the Awarding Authority reserves the right to reject any and all bids, and it shall have the right to waive technical errors and irregularities if, in its judgment, the best interests of the Awarding Authority will be promoted.

17. DETERMINATION OF LOW BIDDER BY USE OF ALTERNATES:

The Awarding Authority may request alternate bid prices (alternates) to facilitate either reducing the base bid to an amount within the funds available for the project or adding items to the base bid within the funds available for the project. Alternates, if any, are listed in the Proposal Form in the order in which they shall cumulatively deduct from or add to the base bid for determining the lowest bidder.

If alternates are included in the Proposal Form, the Awarding Authority shall determine the dollar amount of funds available and immediately prior to the opening of bids shall

announce publicly the funds available for the project. The dollar amount of such funds shall be used to determine the lowest bidder as provided herein below, notwithstanding that the actual funds available for the project may subsequently be determined to be more or less than the expected funds available as determined immediately prior to the time of the opening of bids.

If the base bid of the lowest bidder exceeds the funds available and alternate bid prices will reduce the base bids to an amount that is within the funds available, the lowest bidder will be determined by considering, in order, the fewest number of the alternates that produces a price within the funds available. If the base bid of the lowest bidder is within the funds available and alternate bid prices will permit adding items to the base bid, the lowest bidder will be determined by considering, in order, the greatest number of the alternates that produces a price within the funds available.

After the lowest bidder has been determined as set forth above, the Awarding Authority may award that bidder any combination of alternates, provided said bidder is also the low bidder when only the base bid and such combination of alternates are considered.

18. UNIT PRICES:

a. Work Bid on a Unit Price Basis:

Where all, or part(s), of the planned Work is bid on a unit price basis, both the unit prices and the extensions of the unit prices constitute a basis of determining the lowest responsible and responsive bidder. In cases of error in the extension of prices of bids, the unit price will govern. A bid may be rejected if any of the unit prices are obviously unbalanced or non-competitive.

(1) Bidder may not make changes to the unit price bid schedule form as follows:

(a) Add new line items or delete existing ones

(b) Change the units of measure

(c) Change the quantity

(2) All unit prices must include all work associated with that particular unit including but not limited to labor, materials, equipment, shipping work, overhead, insurance, bonds, and profit incidental to the finished work of that particular unit.

b. Unit Prices for Application to Change Orders:

As a means of predetermining unit costs for changes in certain elements of the Work, the bid documents may require that the bidders furnish unit prices for those items in the Proposal Form. Unit prices for application to changes in the work are not a basis for determining the lowest bidder. Non-competitive unit prices proposed by the successful bidder may be rejected or negotiated by the Awarding Authority prior to contract award. Unit prices for application to changes in the work are not effective unless specifically included and agreed upon in the Construction Contract.

19. AWARD OF CONTRACT:

a. The contract shall be awarded to the lowest responsible and responsive bidder unless the Awarding Authority finds that all the bids are unreasonable or that it is not to the interest of the Awarding Authority 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 Advertisement for Bids and the bid documents. Minor irregularities in the bid shall not defeat responsiveness.

b. A bidder to whom award is made will be notified by email or letter to the address shown on the Proposal Form or email address provided during the bid process at the earliest possible date. Unless other time frames are stipulated in the contract documents, the

maximum time frames allowed for each step of the process between the opening of bids and the issuance of an order to proceed with the work shall be as follows:

(1) Award of contract by Awarding Authority	60 calendar days after the opening of the bids
(2) Contractor's return of the fully executed contract, with bonds and evidence of insurance, to the Awarding Authority	15 calendar days after the Construction Contract has been presented to the Contractor for signature
(3) Awarding Authority's approval of the Contractor's bonds and evidence of insurance and completion of contract execution	20 calendar days after the Contractor presents complete and acceptable documents to the Designer
(4) Notice to Proceed issued to the Contractor	15 calendar days after final execution of Construction Contract by the Awarding Authority, and by the Governor if his or her signature on the contract is required by law

The time frames stated above, or as otherwise specified in the bid documents, may be extended by written agreement between the parties. Failure by the Awarding Authority to comply with the time frames stated above or stipulated in the contract documents, or agreed extensions thereof, shall be just cause for the withdrawal of the Contractor's bid, and contract, without forfeiture of bid security.

c. Should the successful bidder or bidders to whom the contract is awarded fail to execute the Construction Contract and furnish acceptable Performance and Payment Bonds and evidence of insurance within the specified period, the Awarding Authority shall retain from the bid guaranty, if it is a cashier's check, or recover from the principal or the sureties, if the guaranty is a bid bond, the difference between the amount of the contract as awarded and the amount of the bid of the next lowest bidder, but not to exceed the guaranty amount. If no other bids are received, the full amount of the bid guaranty shall be retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the Awarding Authority.

d. All bid guaranties, except those of the three lowest bona fide bidders, will be returned immediately after bids have been checked, tabulated, and the relation of the bids established. The bid guaranties of the three lowest bidders will be returned as soon as the contract bonds and the contract of the successful bidder have been properly executed and approved. When the award is deferred for a period of time longer than 15 days after the opening of the bids, all bid guaranties, except those of the potentially successful bidders, shall be returned. If any potentially successful bidder agrees in writing to a stipulated extension in time for consideration of its bid, the Awarding Authority may permit the potentially successful bidder to substitute a satisfactory bidder's bond for the cashier's check submitted with its bid as a bid guaranty.

e. If no bids or only one bid is received, the Awarding Authority may either re-advertise for bids or direct that the Work shall be done by force account under its direction and control, or negotiate for the Work through the receipt of informal bids not subject to the requirements of Title 39-2-6(b), Code of Alabama (1975).

20. APPROVAL OF CONTRACT:

No Contract is binding upon the Awarding Authority until it has been executed by the Awarding Authority and successful bidder and copies delivered.

21. ASSIGNMENT OF CONTRACT AWARD:

No contract awarded to the lowest responsible and responsive bidder shall be assignable by the successful bidder without written consent of the Awarding Authority, and in no event shall a contract be assigned to an unsuccessful bidder whose bid was rejected because he or she was not a responsible or responsive bidder.

END OF INSTRUCTIONS TO BIDDERS

PROJECT INFORMATION SHEET

Project Name: McLure Library Addition and Renovation – Package D

UA Project #: 051-23-2688D

Scope: Addition and renovation to an existing ~25,000 sf building for the University of Alabama.

Proposed Schedule:

- Advertise: January 7, 2024; January 14, 2024; January 21, 2024.
- Pre-Qualification Packets Due to UA: Tuesday, January 23, 2024 at 5:00pm local time.
- Pre-Qualification Results: January 26, 2024 at 5:00pm local time.
- Pre-Bid: January 30, 2024 at 9:00am local time.
- Bid: February 20, 2024 and 2:00pm local time.

Proposed Budget: 25,730,248.00 BOT Budget

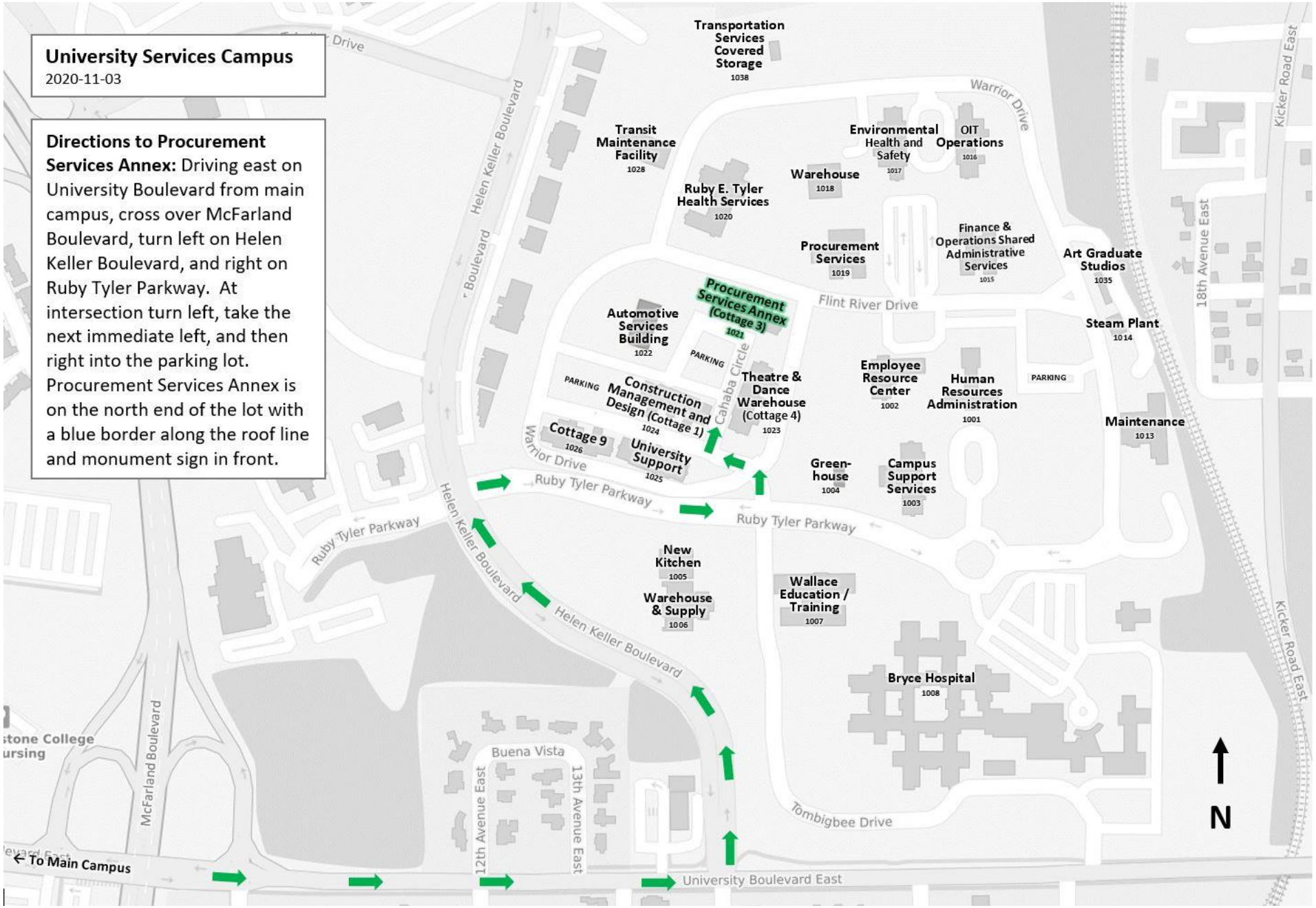
Pre-bid meetings and bid openings are held at the following location:

Procurement Services Annex, located on the University Services Campus (formerly the Partlow Campus) at 405 Cahaba Circle, Tuscaloosa, AL 35404

The address does not always appear on Google Maps or GPS. Please refer to the map on the following page and call Leigh Ann Huguley at (205) 348-9681 if you need additional directions.

University Services Campus
2020-11-03

Directions to Procurement Services Annex: Driving east on University Boulevard from main campus, cross over McFarland Boulevard, turn left on Helen Keller Boulevard, and right on Ruby Tyler Parkway. At intersection turn left, take the next immediate left, and then right into the parking lot. Procurement Services Annex is on the north end of the lot with a blue border along the roof line and monument sign in front.



SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

A. NAMING OF SUBCONTRACTORS AND SUPPLIERS

For certain projects, the Owner may require a list of subcontractors/suppliers to be designated with the bid submittal. Unless otherwise designated in the bid documents, this bid proposal form will have spaces to list these subcontractors/suppliers. The Contractor must utilize those subcontractors and suppliers turned in with their Bid, unless they can demonstrate to the Owner's satisfaction a compelling reason to change any of those named. Upon request from the Owner, Bidder shall produce written confirmation from the originally designated subcontractor or supplier consenting to the change. For each subcontractor trade or supplier required for the base bid, bidders shall name only one entity.

Where the technical specifications give a list of, and the University requires the use of a specialty subcontractor (or other term which means a firm or company who is currently engaged in that trade as their primary work trade), one must be named on the bid proposal form and employed on the project at no additional cost to the Owner.

Should the prime contractor bidder be one who regularly performs one or more of the specialty trades/subcontracts with its own forces, the prime contractor bidder shall list itself, provided it can demonstrate without question to the Owner and the Architect that it performs this specific trade/specialty on a regular basis, utilizing skilled, experienced tradespersons who are on the full time payroll of the prime, and that it has the licensed to do so. Furthermore, the prime must submit proof, when requested by the University, that it has completed a substantial number (ten or more) of similar projects, requiring similar specialty trades during the past two years, using its own forces. (Refer to the General Conditions for other requirements)

Failure to submit this list of subcontractors and suppliers in full with the Bid Proposal Form may render bidder's bid non-responsive.

B. ADDITIONAL SUBMITTALS WITHIN 48 HOURS OF RECEIPT OF BIDS

The apparent low bidder shall submit to the Owner and the Architect on the bidder's letterhead, a complete list of all major subcontractors and all suppliers, including those submitted with their bid. Major subcontractors and suppliers include, but are not limited to sitework/utilities, irrigation/landscaping, masonry, roofing, fire protection, HVAC, plumbing, and electrical. The Owner reserves the right to require additional trades and/or suppliers to be included. This list shall be on contractor's letterhead and include subcontractor's/supplier's name, contact person with their email address, and Alabama license number (unless supplier).

C. PREQUALIFICATION OF PRIME CONTRACTORS & SUBCONTRACTORS

1. As referenced in Article 2.c.and 2.d. of the Instructions to Bidders, the awarding authority may elect to pre-qualify all general contractors and subcontractors listed: sitework/utilities subcontractors, irrigation/landscaping subcontractors, masonry subcontractors, roofing subcontractors, fire protection subcontractors, mechanical/plumbing subcontractors, and electrical subcontractors.
2. A list of prequalified general contractors and subcontractors which require no further prequalification by the Owner are listed in item 5 below.
3. The University decides to prequalify contractors on a "per project" basis. Each projects' advertisement will state if that project is prequalifying and, if so, which disciplines. Information in the advertisement will tell who to contact to receive a "Prequalification Packet" and the deadline to return said packets. General Contractors can get an updated list of subcontractors, when needed, by contacting the UA Project Manager for the project they are interested in bidding.

4. If a project has one main trade, the University may elect to allow one or more of the subcontractors listed below in that trade to bid as a Prime Contractor for that trade-specific project. Such subcontractor would have to meet all the licensing requirements of Title 34, Chapter 8, Code of Alabama.

5. The following list, updated **November 28, 2023**, includes all companies considered to be prequalified at this time without any further action:

General Contractors Unlimited
B L Harbert International, LLC – Birmingham, AL
M. J. Harris Construction Services, LLC – Birmingham, AL
Harrison Construction Company, Inc. - Northport, AL
WAR Construction, Inc. - Tuscaloosa, AL

General Contractors Limited
Cornerstone Restoration, Inc. – Helena, AL ($2,000,000)
Duncan & Thompson Construction Services, LLC – Birmingham, AL ($20,000,000)
Hall-Taylor Construction Company, Inc. – Tuscaloosa, AL ($20,000,000)
K&A Builders, Inc. – Tuscaloosa, AL ($10,000,000)
Kyser Construction, LLC – Tuscaloosa, AL ($5,000,000)
P&M Mechanical, Inc. – Birmingham, AL ($5,000,000)
RCI Contractors & Engineers, Inc. – Tuscaloosa, AL ($5,000,000)
Snow-Blakeney Construction, Inc. – Tuscaloosa, AL ($5,000,000)

AV
AVX Commercial, Inc.- Birmingham, AL
Diversified aka One Diversified- Birmingham, AL
ESB Group, Inc.- Springville, AL
Redpoint Audio, LLC – Tuscaloosa, AL

Demolition and Abatement
Alabama Restoration and Remediation, LLC – Tuscaloosa, AL
D. H. Griffin Wrecking Company, Inc. – Birmingham, AL
MAK Environmental, LLC – Northport, AL

Electrical
A & B Electric Company, Inc. - Tuscaloosa, AL
Bright Future Electric, LLC – Birmingham, AL
Marathon Electrical Contractors, Inc. - Birmingham, AL
Mills Electric, Inc. - Tuscaloosa, AL
Patco Electrical Contractors, Inc. – Tuscaloosa, AL
Premier Service Company, Inc. - Tuscaloosa, AL
Taylor Electrical Contractors, Inc. – Tuscaloosa, AL
Team B Electrik, LLC – Brookwood, AL

(continued)

Fire Protection
Alabama Fire Sprinkler Contractors, LLC – Alabaster, AL
American Fire Protection, LLC – Birmingham, AL
Central Fire Protection, Inc. – Homewood, AL
International Fire Protection, Inc. - Irondale, AL
Joiner Fire Sprinkler Co., Inc. – Birmingham, AL
United States Sprinkler, Inc. – Birmingham, AL

Heating, Ventilation and Air Conditioning (HVAC)
Adkins and Kimbrough Mechanical, LLC – Bessemer, AL
Bradley Plumbing and Heating, Inc. – Montgomery, AL
Burkes Mechanical, Inc. - Brent, AL
Comfort Systems USA Mid South, Inc. – Birmingham, AL
Hardy Corporation – Birmingham, AL
J. D. Esco, Inc. – Tuscaloosa, AL ($250,000)
Jolly Heating and Air Conditioning, Inc. – Northport, AL
McAbee Construction, Inc. - Tuscaloosa, AL
McKelvey Mechanical, Inc. - Tuscaloosa, AL
P&M Mechanical, Inc. – Birmingham, AL
Premier Service Company, Inc. – Tuscaloosa, AL
Southern Air, Inc. – Tuscaloosa, AL

Landscape / Irrigation
GLS, LLC (Guthrie Landscape Services) - Tuscaloosa, AL
GradeScape, Inc. – Northport, AL
Landscape Workshop, LLC – Bessemer, AL
Traweek Construction, LLC – Northport, AL

Masonry
Flurry Masonry, LLC – Pell City, AL
Jones Masonry Construction, Inc. – Tuscaloosa, AL
Selective Masonry, Inc. – Birmingham, AL

Plumbing
Adkins and Kimbrough Mechanical, LLC – Bessemer, AL
Black Warrior Mechanical Contractors, Inc. – Tuscaloosa, AL
Bradley Plumbing and Heating, Inc. – Montgomery, AL
Comfort Systems USA Mid South, Inc. – Birmingham, AL
Hardy Corporation – Birmingham, AL
Jimmy Hall Plumbing Company, Inc. - Tuscaloosa, AL
John Wayne Plumbing & Drain Services Company, Inc. – Tuscaloosa, AL
McAbee Construction, Inc. - Tuscaloosa, AL
P&M Mechanical, Inc. – Mt. Olive, AL
Turner Plumbing, Inc. – Tuscaloosa, AL

(continued)

Roofing

Alabama Roofing & Sheet Metal Co., Inc. - Anniston, AL
All-South Subcontractors, Inc. - Birmingham, AL
Deason Roofing & Sheet Metal Contractors, Inc. – Tuscaloosa, AL
Johns and Kirksey, Inc. - Tuscaloosa, AL
Metal Roofing Solutions, Inc. – Tuscaloosa, AL
Standard Roofing of Montgomery, Inc. – Montgomery, AL

Sitework / Utilities

Ballard Contractors, Inc. – Moundville, AL
Chilton Contractors, Inc. – Clanton, AL
CivilWorx Construction, LLC – Tuscaloosa, AL
Cornerstone Civil Contractors, LLC - Tuscaloosa, AL
Dominion Construction Company, Inc. – Duncanville, AL
GFC Construction, Inc. - Duncanville, AL
John Plott Company, Inc. – Tuscaloosa, AL
L&D Moore Contracting, LLC – Tuscaloosa, AL
Lavender, Inc. – Aliceville, AL
Price Civil Services, Inc. – Vance, AL
Price Construction Company, Inc. – Tuscaloosa, AL
REV Construction, Inc. – Tuscaloosa, AL
Russo Corporation – Birmingham, AL

Waterproofing and Concrete Repair

Building Restoration and Waterproofing Company (BRAWCO), Inc. – Bessemer, AL
C-Sharpe Co., LLC – Orange Beach, AL
J. J. Morley Enterprises, Inc. – Birmingham, AL
RCS Waterproofing, LLC – Pelham, AL (Waterproofing Subcontractor Only)
Simpson Plastering, LLC – Birmingham, AL
Western Specialty Contractors – Atlanta, GA

END OF SUPPLEMENTAL INSTRUCTIONS TO BIDDERS

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____, as Principal; and
Name and Address of Bidder

_____, as Surety,
Name and Principal Place of Business of Surety

are hereby held and firmly bound unto THE BOARD OF TRUSTEES OF THE UNIVERISTY OF ALABAMA hereinafter called the Owner **in the sum of five percent (5%) of the amount of bid but in no event more than Ten thousand Dollars ($10,000)** for the payment of which sum, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owners a certain Bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the,

_____
Project Name and UA Project Number

NOW, THEREFORE,

a. If said Bid shall be rejected, or, in the alternate,
b. If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Agreement attached hereto and shall execute and deliver Performance and Payment Bonds in the Forms attached hereto (all properly completed in accordance with said Bid), and shall in all other respects perform the agreement created by the acceptance of said Bid,

Then, this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereinunder shall be the amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of such extension.

IN WITNESS WHEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____20____ the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

_____
Principal

_____ By_____
Witness Name and Title (Affix Seal)

_____
Surety

_____ By_____
Witness Name and Title (Affix Seal)

BID PROPOSAL FORM

THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA
c/o Construction Administration
Box 870186
413 Cahaba Circle
Tuscaloosa, Alabama 35487-0186

BID PROPOSAL FOR:
McLure Library Renovation and Addition – Package D

UA Project # **051-23-2688D**

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

The Bidder further declares that he has examined the site of the work, and informed himself fully in regard to all conditions pertaining to the place where the work is to be done, and that he has examined the Drawings and Specifications, including Addenda Nos._____ for the work and the other Contract Documents relative thereto, and that he has satisfied himself relative to the work to be performed.

The Bidder certifies by submitting this bid that they are in full compliance with the Code of Alabama, Section 39-3-1 and 39-3-4 and agrees to provide domestic products if the same are available at reasonable and competitive prices. The Bidder further certifies and agrees that if foreign made materials prices have been used as the basis of the bid because domestic products are not available at a reasonable and competitive price, there has been a downward adjustment in contract price equal to any realized savings or benefit to the Bidder and the foreign materials utilized are of an equal or greater quality.

The Bidder certifies by submitting this bid that they are in full compliance with State of Alabama Act No. 2006-557, that they are not barred from bidding or entering into a contract pursuant to Section 41-4-116, Code of Alabama 1975, and that they acknowledge that the Awarding Authority may declare the bid and/or contract void if the certification is false.

The Bidder further declares that he is aware of the tax exempt status of the Owner and that sales/use/severance taxes are **excluded** from the amount of the bid. The Owner may elect to enter into a "Purchasing Agent Agreement" as described in the Contract Documents.

In compliance with your Advertisement for Bids dated _____and subject

to all the conditions thereof, the undersigned _____

Alabama General Contractor's License #_____

Classification _____, A corporation organized and existing under the

Laws of the State of _____.

A Partnership consisting of _____

Or an Individual trading as _____of the City of _____
Hereby proposed to furnish all labor and materials and perform all work required for the construction of _____
in accordance with Drawings and Specifications.

BASE BID: For construction complete as shown and specified, the sum of _____

_____

Dollars ($_____)

ESTIMATED SALES TAX: $_____

UNIT PRICES (Costs to be included in Base Bid): For identified items of work the undersigned proposes unit prices as listed below to identify each item of work item and its appropriate unit designation for purposes of cost identification for any additive or deductive amounts to the Base Bid amounts. Unit Prices are fully described in "Section 01 22 00 - Unit Prices."
1. Each unit price shall include all consideration for labor, materials, taxes, overhead, profit, equipment and any other costs for installation of the unit. Unit prices shall be the same for additive or deductive amounts

Unit Price No. 1 - Floor Leveling and Patching Material:

_____ **$ per Cubic Foot**

Unit Price No. 2 - Additional Light Structural Steel:

_____ **$ per TON**

Unit Price No. 3 - Infilling Holes in Slabs (6" across or less):

_____ **$ per Hole**

Unit Price No. 4 - Infilling Holes in Slabs (6" to 12" across):

_____ **$ per Linear Foot.**

Unit Price No. 5 – Excavation and Replacement of Unsuitable Materials

_____ **$ per cubic yard in-place.**

Unit Price No. 6 - Infilling Holes in Slabs (between 6"and 12" across):

_____ **$ per hole.**

Unit Price No. 7 - Infilling Holes in Slabs (between 12"and 24" across):

_____ **$ per hole.**

ADDITIVE ALTERNATES: Alternates are fully described in **"Section 01 23 00 - Alternates."** (Alternates must have estimated sales taxes for each Alternate)

ADD ALTERNATE 1 -- Decorative Pendant Lighting:

For construction complete as shown and specified, the sum of

_____

Dollars ($_____)

ESTIMATED SALES TAX: $_____

ADD ALTERNATE 2 -- Provide custom snap-in window head and jamb panning:

For construction complete as shown and specified, the sum of

_____

Dollars ($_____)

ESTIMATED SALES TAX: $_____

Required Listing of Subcontractors/Suppliers: N/A

List the subcontractors/suppliers for the trades listed below which you intend to use for the base bid. If no trades are designated, the listing is not required. List yourself for work you intend to self-perform. Any envelope adjustments to this section must be initialed by the bidder. Failure to complete this section may render your bid non-responsive. See Supplementary Instructions to Bidders for additional information.

(List requested trades here, if any)

To be filled out if cashier's check accompanies bid:

The undersigned further agrees that in case of failure on his part to execute the Contract Agreement and required Contract Bonds within fifteen (15) consecutive calendar days after being given written notice of the Award of the Contract, the check accompanying this Bid and the monies thereon shall be paid into the funds of **THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA, a corporation** as liquidated damages for such failure; otherwise the check accompanying this Proposal shall be returned to the undersigned.

Attached hereto is a cashier's check on the _____
(Institution Name)

_____

for the sum of _____Dollars

($_____).

To be filled out if bidder's bond accompanies bid:

The undersigned further agrees that in case of failure on his part to execute the Contract and Required Contract Bonds within fifteen (15) consecutive calendar days after being given written Notice of the award of the Contract, the Bidder's Bond accompanying this Bid is callable and the Surety will be called upon the Owner(s) for the liquidation; otherwise said Bidder's Bond shall be returned to the undersigned.

Attached hereto is a bidder's bond of _____
(Bonding Company)

for the sum of _____Dollars

($_____) made payable to **THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA, a corporation.**

The full names and residences of persons and firms submitting the bid as Principles are as follows: (must be signed to be a valid bid proposal)

_____ Date: _____
Signature of Bidder

_____
Title

_____

_____
Business Address

DOCUMENT 00 43 25

SUBSTITUTION REQUEST FORM DURING BIDDING

(Bidders shall use this form for submitting substitution requests during Bidding. Other forms of substitution requests will not be considered. This form must be received by Architect not later than 10 calendar days prior to Bid Opening Date)

Project: McLure Library Addition and Renovation
Package D
University of Alabama

Substitution Request Number: _____

Re: _____

To: KPS Group, Inc.
60 14th Street South, Suite 100
Birmingham, Alabama 35233

From: _____

Specification Title: _____ Section: _____

Description: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New Product ☐ 1 – 4 years old ☐ 5 – 10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point by Point comparative data attached – REQUIRED BY ARCHITECT

Reason for not providing specified item: _____

_____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ___ No ___ Yes: Explain _____

_____

Savings to Owner for accepting substitution:_____ ($ _____)

Proposed substitution changes Contract Time: ___No ___ Yes [Add] [Deduct] _____ days.

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

The Undersigned Certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: _____ Signed By: _____

Firm: _____

Address: _____

_____

Telephone: _____ Fax: _____

E-mail: _____ Website: _____

Attachments: _____

_____

A/E's REVIEW AND ACTION (to be filled-in by Architect/Engineer)

- ☐ Substitution Approved
- ☐ Substitution Approved as Noted
- ☐ Substitution Rejected
- ☐ Substitution Request Received Too Late

Signed By: _____ Date: _____

Additional Comments:

☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

END OF DOCUMENT

FOR REFERENCE ONLY. THIS FORM WILL BE COMPLETED ELECTRONICALLY. DO NOT SUBMIT ON PAPER. CONTACT THE UA PROJECT MANAGER WITH QUESTIONS.

CONTRACT AGREEMENT FOR CONSTRUCTION

THIS AGREEMENT, entered into this _____ day of _____ by and between THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA, a corporation, the party of the first part (hereinafter called the Owner) and _____, party, of the second part (hereinafter called the Contractor).

WITNESSETH that the Owner and the Contractor, in consideration of premises and of the mutual covenants, considerations, and agreements herein contained, agree as follows:

STATEMENT OF WORK: The Contractor shall furnish all labor and materials and perform all work for the _____**, UA Project #** _____ (the "Work") in strict accordance with the Contract Documents as follows: Plans dated _____and consisting of _____ sheet(s) and Specifications dated _____ and consisting of _____ pages prepared by _____, including Addenda # _____ thereto dated _____, which are hereby made a part of this Agreement as fully and to the same effect as if the same had been set forth at length in the body of this Agreement.

TIME OF COMPLETION: The Contractor will begin construction upon notification by the Owner to proceed and agrees to complete all work within _____ **(_____)** consecutive calendar days after notice to proceed is given as stated in Contract Documents.

COMPENSATION TO BE PAID: The Owner will pay and the Contractor will accept in full consideration for the performance of the Work, subject to additions and deductions (including liquidated damages) as provided in the Contract Documents, the total contract sum of _____ _____**($)**, inclusive of both the Base Bid for the aforesaid Work _____ _____**($)** and the accepted Alternate Prices: _____ _____**($).** (List Unit Prices here, if applicable)

PARTIAL AND FINAL PAYMENTS shall be made in accordance with Article 28 of the General Conditions.

Electronic Form

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.

The Contractor and the Owner for themselves, their successors, executors, administrators, and assigns, hereby agree to the full performance of the covenants herein contained.

IN WITNESS WHEREOF, the parties hereto on the day and year first above written have executed this Agreement in four counterparts each of which shall without proof or accounting for the other counterparts be deemed an original thereof.

The Owner does hereby certify that this contract was let in accordance with the provisions of Title 39 Code of Alabama 1975, as amended.

CONTRACTING PARTIES

The Board of Trustees of the University of Alabama
(Owner)

By: _____
Cheryl Mowdy
Title: Interim Vice President for Finance and Operations

_____
(Contractor)

By: _____

Title: _____

Electronic Form

BOND FOR PERFORMANCE OF THE WORK

STATE OF ALABAMA) CITY OF TUSCALOOSA
COUNTY OF TUSCALOOSA)

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____, as Principal, and _____

as Surety, are held and firmly bound unto **THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA** hereinafter called the Owner, as their interests appear, in the penal sum of _____ Dollars ($_____) for the payment of which sum well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, we have hereunto set out hands and affixed our seals this _____ _____day of _____, _____.

PROVIDED, HOWEVER, that the condition of this obligation is such that whereas the above bound PRINCIPAL entered into a certain Contract with said THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA for the (construction), (reconstruction) and (improvement) of ; _____, Project No._____ _____ a copy of the Contract Agreement therefore is hereto attached. Surety consents and agrees to be bound for any increase up to 10 percent of the amount of the attached Contract Agreement.

NOW, THEREFORE, in the event the said PRINCIPAL, as such Contractor, shall faithfully and promptly perform said Contract during the original term of said Contract and any extensions thereof that may be granted by the Owner, and all the conditions and requirements thereof, then this obligation shall be null and void and of no effect; otherwise to remain and be in full force and effect.

PROVIDED, further, that upon the failure of the said PRINCIPAL to promptly and efficiently prosecute said Work, in any respect, in accordance with the Contract Documents, the above bound _____as Surety, shall take charge of said Work and complete the Contract at his own expense, pursuant to its terms, receiving, however, any balance of the funds in the hands of said THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA, a corporation (The Owner) due under said contract.

In the event said Principal shall fail or delay the prosecution and completion of said work and said Surety shall also fail to act promptly as hereinbefore provided, then the Owner may cause

ten (10) days' notice of such failure to be given, either to said Principal or Surety, and at the expiration of said ten (10) days, if said Principal or Surety do not proceed promptly to execute said contract,

THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA

Shall have the authority to cause said Work to be done, and when the same is completed and the cost thereof estimated, the said Principal and Surety shall and hereby agree to pay any excess in the cost of said Work above the agreed price to be paid under said Contract.

Upon the completion of said Contract pursuant to its terms, if any funds remain due on said Contract, the same shall be paid to said Principal or Surety.

The said Principal and Surety further agree as part of this obligation to pay all such damages of any kind to person or property that may result from a failure in any respect to perform and complete said Contract.

The decision of said Owner, upon any question connected with the execution of said Contract, or any failure or delay in the prosecution of the Work by said Principal or Surety, shall be final and conclusive.

The Advertisement for Bids, Instructions to Bidders, Proposal, General Conditions of the Contract, Detailed Specification Requirements, Drawings, and the Contract Agreement hereinbefore referred to, and the Bond for the Payment of Labor, Materials, or Supplies executed under the provision of Chapter 1, Title 39, Alabama Code of 1975, are made a part of this obligation, and this instrument is to be construed in connection therewith.

IN WITNESS WHEREOF, the parties have executed this instrument under their several seals this _____ day of _____ , _____, the name of corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST:	PRINCIPAL:
_____	_____
Countersigned by Alabama Resident Agent for Surety:	BY: _____ (Title
	SURETY:
_____ (Name)	_____
_____ (Address)	BY: _____ (Title)

NOTE: Power of Attorney in connection with the above noted Surety Bond shall be furnished with the original Surety Bond.

BOND FOR PAYMENT
OF LABOR, MATERIALS, OR SUPPLIES

STATE OF ALABAMA) CITY OF TUSCALOOSA
COUNTY OF TUSCALOOSA)

KNOW ALL MEN BY THESE PRESENTS: That we _____

_____., as Principal, and _____ as Surety, are held and firmly bound unto **THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA** hereinafter called the Owner, as their interests appear, in the penal sum of _____ _____ Dollars ($_____) for the payment of which sum well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, we have hereunto set out hands and affixed our seals this _____day of _____, _____.

PROVIDED, HOWEVER, that the condition of this obligation is such that whereas the above bound PRINCIPAL entered into a certain Contract with said THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ALABAMA for the construction of ;

_____ U of A Project No._____;

a copy of the Contract Agreement therefore is hereto attached. Surety consents and agrees to be bound for any increase up to 10 percent of the amount of the attached Contract Agreement.

NOW, THEREFORE, in the event the said PRINCIPAL, as such Contractor, shall make payment to all persons supplying him or them with labor, material, or supplies for or in the prosecution of the Work provided for in said Contract and any and all modifications of said Contract that may hereafter be made, then this obligation shall be null and void and of no effect; otherwise to remain and be in full force and effect.

PROVIDED, further in the event that the said PRINCIPAL, as such Contractor, shall fail to make prompt payment to all persons supplying him or them with labor, materials, or supplies for or in the prosecution of the Work provided for in such Contract the above bound _____as Surety shall be liable for the payment of such labor, materials, or supplies and for the payment of reasonable attorney's fees incurred by successful claimants or plaintiffs in suits on said bond as provided in Chapter 1, Title 39, Alabama Code of 1975.

PROVIDED, further, that said Contractor and Surety hereby agree and bind themselves to the mode of service described in Chapter 1, Title 39, Alabama Code of 1975 and consent that such service shall be the same as personal service on said Contractor or Surety.

Upon the completion of said Contract pursuant to its terms, if any funds remain due on said Contract, the same shall be paid to said Principal or Surety.

The decision of the Owner, upon any question connected with the execution of said Contract, or any failure or delay in the prosecution of the Work by said Principal or Surety, shall be final and conclusive.

The Advertisement for Bids, Instructions to Bidders, Proposal, General Conditions of the Contract, Detailed Specification Requirements, and Drawings, and Contract Agreement hereinbefore referred to, and the Bond for Performance of the Work executed under the provisions of Chapter 1, Title 39, Alabama Code of 1975 are made a part of this obligation and this instrument is to be construed in connection therewith.

IN WITNESS WHEREOF, the parties have executed this instrument under their several seals this _____ day of _____, _____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

ATTEST:	PRINCIPAL:
_____) _____	_____
Countersigned by Alabama Resident Agent for Surety:	BY: _____ (Title)
	SURETY:
_____ (Name)	_____
_____) _____ (Address)	BY: _____ (Title)

NOTE: Power of Attorney in connection with the above noted Surety Bond shall be furnished with the original Surety Bond.

FOR REFERENCE ONLY. THIS FORM WILL BE COMPLETED ELECTRONICALLY. DO NOT SUBMIT ON PAPER. CONTACT THE UA PROJECT MANAGER WITH QUESTIONS.

University of Alabama System

Individually Distinct. Altogether Stronger.

VENDOR DISCLOSURE STATEMENT

In compliance with the policies of The Board of Trustees of the University of Alabama, The University of Alabama System Office, this University, and with Alabama state law, this Disclosure Statement shall be completed on a per contract basis for all contracts, including but not limited to proposals, bids, and contracts, including consulting/professional service contracts unless otherwise exempted ("Agreements"). The Board of Trustees of The University of Alabama reserves the right to refuse to enter into or to cancel, without penalty, any contract or agreement with any entity or individual who does not provide all of the information requested below, or who makes false or incomplete disclosures.

Definitions

For the purposes of this form, the following terms shall have the following meanings:

- **"Agreement."** Any single agreement, contract, memorandum of understanding, or grant document under which goods or services are to be provided by You.
- **"Entity."** The corporation, partnership, sole proprietorship, individual or business of any kind in whose name or on whose behalf the goods or services are being provided to the University.
- **"Family Member."** Your spouse, dependent, an adult child and his or her spouse, a parent, a spouse's parents, and a sibling and his or her spouse. The term "Dependent" shall include any person, regardless of his or her legal residence or domicile, who receives more than 50 percent of his or her support from the public official or employee or his or her spouse, or who resides with the public official or employee for more than 100 days during the reporting period.
- **"Public Official."** Any person elected to public office, whether or not that person has taken office, by vote of the people at state, county, or municipal level of government or their instrumentalities, including governmental corporations, and any person appointed to take a position at the state, county, or municipal level of government or their instrumentalities, including governmental corporations.
- **"Relationship."** Limited to familial or business in nature, or a personal relationship that the existence of which creates a Conflict of Interest or the appearance of a Conflict of Interest that would require disclosure under Board Rule 106.
- **"UAS."** The Board of Trustees of The University of Alabama, and its constituent divisions including The University of Alabama System Office, The University of Alabama, The University of Alabama at Birmingham, and The University of Alabama in Huntsville.
- **"You."** Includes (1) the individual(s) or representative(s) of the Entity who (a) solicited the Agreement or (b) are responsible for managing the account or relationship with the University, and their partners or co-owners; and (2) any member of the of foregoing individuals' immediate family (that You know to have a direct familial relationship with a UAS employee or official or family member of a UAS employee or official).

---

1. **Name of Entity and Individual Completing this Form (may be completed by an authorized account manager/representative)**

Entity Name:

Individual Name:

Title:

Address Line 1:

Address Line 2:

City, State, Zip: Telephone:

Electronic Form

2. **UAS Entity with which You propose an Agreement? (i.e. University, College, Department, etc.)**

3. **Describe the proposed Agreement:**

   Goods and services to be provided:

   Grant or proposal number (if applicable):

   Amount or anticipated amount:

   Term:

   Is the proposed Agreement the result of a competitive or bid process? **Yes** ☐ **No** ☐

4. **Have "You" (See definition above) or the Entity supplying the goods or services previously provided goods and/ or services to UAS within the current or last fiscal year? Yes** ☐ **No** ☐

   If yes, please provide the following information for each other agreement for such goods and/or services.

   Entity Providing Goods or Services: _____

   Campus and Department: _____

   Type of Goods/Services: _____

   Amount Received: _____

   Entity Providing Goods or Services: _____

   Campus and Department: _____

   Type of Goods/Services: _____

   Amount Received: _____

   If you need to provide further details on goods or services provided to UAS within the current or last fiscal year, please attach an addendum to this Disclosure Statement.

5. **Did the amount of goods and /or services identified in response to Question 4 total $1,000,000 or more?** ☐ **Yes** ☐ **No**

6. **a. Do You have a relationship with any UAS employee or Trustee who may directly or indirectly receive any benefit from the proposed Agreement, or whose family member or business may directly or indirectly benefit?** ☐ **Yes** ☐ **No**

   b. Do You have a relationship with any Public Official who may directly or indirectly receive any benefit from the proposed Agreement, or whose family member or business may directly or indirectly benefit? ☐ **Yes** ☐ **No**

   If You answered "Yes" to questions **6.a.** and/or **b.**, please provide the following information for each UAS employee, Trustee, or Public Official with whom You have a Relationship.

   Name of UAS employee, Trustee, or Public Official: _____

   Campus/department where employed or position held: _____

   Nature of relationship: _____

   Potential Benefit: _____

Electronic Form

Name of UAS employee, Trustee, or Public Official: _____

Campus/department where employed or position held: _____

Nature of relationship: _____

Potential Benefit: _____

If you need to provide further information regarding UAS employee(s) or Trustee(s), or Public Officials with whom You have a Relationship, and who may directly or indirectly benefit from this Agreement, please attach an addendum to this Disclosure Statement.

7. **Have any paid consultants, lobbyists, and/or Public Official assisted in obtaining the proposed Agreement?** ☐ **Yes** ☐ **No**

If yes, please provide the following information for each consultant or lobbyist.

Name: _____

Address: _____

Name: _____

Address: _____

If you need to provide further information regarding paid consultants and/or lobbyists utilized to obtain the proposed Agreement, please attach an addendum to this Disclosure Statement.

8. **List any current litigation or administrative action that has been filed within the last 3 years, either state or federal, related to public or higher education construction or finance that the contractor or others associated with the firm may have against them.**

By signing below, I certify under oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. By proposing or entering into an Agreement with UAS, I certify I am authorized to complete this form on behalf of the Entity in whose name or on whose behalf goods or services are being provided, and I further certify no employee or official of UAS, nor any of their family members or any business with which they may be associated, will receive a benefit from this contract, except as has been disclosed, in writing herein. I will promptly disclose any Relationship which may arise in the future, or any existing Relationship which may become known to me, and update this statement to disclose the same.

_____

Signature Date

Electronic Form

GENERAL CONDITIONS
CHANGE LOG

It is the responsibility of the Bidder to read and familiarize themselves with these General Conditions prior to bidding a job since they will become a part of their contract. Occasionally, the University deems it necessary to make changes in the General Conditions. When we do so, we will list those changes on this page along with the date of the change. Once a particular change has been shown on this page for six (6) months we will drop it from this page. This page is being done for the convenience of the Bidder only and in no way shall the University be responsible for any inadvertent change being left off this page. It is the responsibility of the Bidder to read the General Conditions and capture changes. **The Bidder is always responsible for reading and understanding the General Conditions prior to bidding.**

Article changed	Date changed
Article 50	06/16/23
Article 14	07/20/23
Article 1	09/01/23
Article 2	09/01/23
Article 4	09/01/23
Article 5	09/01/23
Article 6	09/01/23
Article 7	09/01/23
Article 9	09/01/23
Article 10	09/01/23
Article 11	09/01/23
Article 13	09/01/23
Article 14	09/01/23
Article 18	09/01/23
Article 19	09/01/23
Article 28	09/01/23
Article 31	09/01/23
Article 43	09/01/23
Article 50	09/01/23
Article 57 (Added)	09/01/23
Article 58 (Added)	09/01/23
Article 59 (Added)	09/01/23
Article 60 (Added)	09/01/23

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43. Allowances
44. Use of Premises; Sanitary Provisions
45. Cutting and Patching
46. Periodic and Final Cleanup
47. Guarantee of the Work
48. Possession Prior to Completion
49. Liquidated Damages
50. Use of Foreign Materials
51. Equal Opportunity
52. Sign
53. No Smoking Policy
54. Parking & Transportation Requirements
55. Construction Debris Reporting
56. Commercial Use of Images of the Work
57. Minority & Women Owned Business
58. Safety
59. Miscellaneous - Drones, Software
60. Legal

1. CONTRACT DOCUMENTS:

The contract consists of the following CONTRACT DOCUMENTS, including all additions, deletions and modifications incorporated therein before the execution of the Contract Agreement:

A. STATUTORY AND PROCEDURAL DOCUMENTS:

1. Advertisement for Bids (Invitation for Bids)
2. Instructions to Bidders (Information for Bidders)
3. Bid Proposal (Bid Form)
4. Bid Guaranty (As required by Article 6 of Instructions to Bidders)
5. Contract Agreement for Construction Form
6. Contract Bonds (Performance and Material Bond Forms as required by Article 32 of General Conditions of Contract)
7. Evidence of Insurance
8. Vendor Disclosure Statement
9. E-Verify Proof of Enrollment- Awarded Bidder must show evidence of being enrolled in the U.S. Government E-Verify Program. Said evidence shall be submitted with the Contract for Construction. Failure to do so will be grounds for Contract not to be executed.

B. GENERAL CONDITIONS OF THE CONTRACT

C. DETAILED SPECIFICATION REQUIREMENTS

D. DRAWINGS

2. DEFINITIONS, INTENT, CORRELATIONS, AND STREAMLINING:

A. DEFINITIONS:

Wherever the following abbreviations and terms, or pronouns in place of them, are used in the Contract Documents, the intent and meaning shall be as interpreted as follows:

1. AWARDING AUTHORITY OR OWNER: The Board of Trustees of The University of Alabama, a corporation, the Party of the First Part to the Contract Agreement, acting through its authorized representatives.

2. BID: The written offer for the Work contemplated, made out and submitted by the Bidder in the required manner, on the prescribed Bid Proposal Form, property signed, and guaranteed.

3. BIDDER: The person or persons, firm, partnership, association, corporation, or combination thereof, submitting a Bid for the Work, or any portion thereof, acting directly or through a duly authorized representative who has met the licensing requirements for general contracting as required by Title 34, chapter 8, Code of Alabama (1975), as amended.

4. COMMISSION: The Alabama Department of Finance – Division of Construction Management, or any agency that may be designated by the Legislature as its successor.

5. CONTRACT AGREEMENT: The written Contract Agreement for Construction executed between the Awarding Authority and the successful Bidder, covering the performance of the Work, by which the Contractor is bound to perform the Work and to furnish the labor, materials, and equipment under the terms of the Contract Documents, and by which the Awarding Authority is obligated to compensate the Contractor therefore at the mutually established and accepted rate or price, or as hereinafter provided.

6. CONTRACT BONDS: The approved bonds, required by Chapter 1, Title 39, Code of Alabama (1975), as amended, and furnished by the Contractor and its Surety to guarantee both completion of the Contract in accordance with the Contract Documents and prompt payment to all persons supplying labor, materials, supplies, etc.

7. CONTRACTOR: The person or persons, company, firm, partnership, association, corporation, limited liability company, cooperative or combination thereof, the Party of the Second Part to the Contract Agreement, acting directly or through its agents or employees.

8. DESIGNER: The professional person, firm, association, or corporation who, having met requirements of Title 34, Code of Alabama (1975), as amended, has indicated by seal or signature and license number that full responsibility has been accepted for the design, and who has been employed by the Awarding Authority, or in case of the termination of his employment, his successor designated by the Awarding Authority, to furnish the drawings and specifications in the Contract Documents.

9. DIRECTOR: The Director, Technical Staff, or the Alabama Department of Finance – Division of Construction Management, acting either upon his own initiative or through the Project Manager or other duly authorized Supervisors and Inspectors, acting severally within the scope of the particular duties entrusted to them or the authority given them.

10. MODIFICATIONS OF THE GENERAL CONDITIONS: Changes or modifications of the parts of these General Conditions.

11. NOTICE TO PROCEED: A proceed order issued by the Awarding Authority, within fifteen (15) days after final execution of the Contract Agreement, unless both parties agree in writing to a stipulated extension in time for the issuance of a proceed order, fixing the time within which the Contractor shall begin the prosecution of the Work.

12. SUPPLEMENTAL GENERAL CONDITIONS: Additional special or general requirements that are necessary and peculiar to the particular project and which are not included in the parts of these General Conditions.

13. SPECIFICATIONS: The general term comprising the Statutory and Procedural Documents, General Conditions of the Contract, the detailed Specification requirements, together with all modifications thereof and all Addenda thereto.

14. SUBCONTRACTOR: Any properly qualified individual, firm, association, or corporation undertaking the performance of any part of the Work under the terms of the Contract Documents by virtue of any agreement between the Subcontractor and the Contractor with the prior written approval of the Awarding Authority.

15. SURETY: The corporate body, licensed under the laws of Alabama, bound with and for the Contractor for the full and complete performance of the Contract and also for the payment of all claims recoverable under the Contract Bonds.

16. THE PROJECT: The total work described in the Contract Documents.

17. THE WORK: The work shall mean whatever is done or required of the Contractor to perform and complete its duties under the Contract Documents including, without limitation, the following: construction of the whole or designated part of the Project; furnishing of any required surety bonds and insurance; and the provision or furnishing of all labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, permits and licenses required of the Contractor, fuel, heat light cooling and all other utilities as required by the Contract Documents.

B. INTENT:

The intent of the Contract Documents is to include all labor, supplies, materials, water, fuel, tools, equipment, plants, utility and transportation services, and all other incidental services and expenses necessary or required for the complete, correct, proper and timely execution of the Work.

C. CORRELATION:

1. ORDER of PRECEDENCE Should any discrepancy arise between the various elements of the Contract Documents, precedence shall be given to them in the following order unless to do so would contravene the apparent Intent of the Contract Documents stated in preceding Paragraph A:

   (a) The Construction Contract.
   (b) Addenda, with those of later date having precedence over those of earlier date.
   (c) Supplementary Conditions (or other Conditions which modify the General Conditions of the Contract).
   (d) General Conditions of the Contract.
   (e) The Specifications.
   (f) Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
   (g) The Drawings; large scale drawings shall take precedence over smaller scale drawings.

2. WORDS AND TERMS: Words used in the documents will be given their usual and common meaning unless, from the entire Contract, it is clear that some other meaning was intended. Words describing material and work which have a well-known technical meaning or trade meaning, unless specifically defined in the Contract Documents will be construed in accordance with such well-known meaning recognized by architects, engineers, and the trade. Technical terms will be construed in a technical sense, and a specifically widely adopted trade meaning afforded certain terminology will be considered in any interpretation containing such terminology.

3. GENERAL AND SUPPLEMENTAL GENERAL CONDITIONS: Where both General and Supplemental General Conditions relate to the same thing, the Supplemental General Conditions will prevail; that is, the specific language will take precedence over the more general wording; however, where both the General and Supplemental General Conditions may be given reasonable effect, both are to be retained.

4. PRINTING, TYPING, AND WRITING RECONCILING DISCREPANCIES:

   If there is a discrepancy between figures and words, words will govern. Written specifications will take precedence over drawings. If a correction is made in specifications or on a drawing and the original conflicting statement is not crossed out, then the revision, written in or drawn in, will be considered what was meant.

   Obvious clerical or drafting errors or omissions revealed by perusal of the Contract Documents as a whole will be discounted in determining the intent of the parties, insofar as this may be accomplished without contravention or legal principles or public policy.

5. DRAWINGS AND SPECIFICATIONS: The intent of the Specifications is to outline or indicate in items of work that cannot readily be shown of the Drawings and, further, to indicate types and qualities of materials and workmanship. Drawings and Specifications will be considered complementary, and items of work mentioned or indicated on one and not on the other shall be included as if mentioned in both, except items definitely noted "Not in Contract" or marked "N.I.C."

6. CONTRACTOR'S CHECK: Prior to the execution of the Work, the Contractor shall carefully read, examine, and study the Drawings and Specifications and shall immediately report all ambiguities, inconsistencies, conflict, errors, discrepancies, deviations from industry standards or from manufacturer's recommendations, and/or omissions discovered therein by letter to the Awarding Authority. All such ambiguities, inconsistencies, conflicts, errors, discrepancies, deviations from industry standards or from manufacturer's recommendations, and/or omissions will be adjusted by the Awarding Authority who will notify the Contractor. Any adjustments made by the Contractor without prior approval will be at Contractor's own risk, and the settlement of any complications arising from such adjustment will be at Contractor's own expense.

7. EXPLANATIONS: Any doubt as to the meaning of the Drawings or Specifications, or any obscurity as to the wording of them, will be explained by the Awarding Authority and all directions and explanations requisite or necessary to complete, explain or make definite any of the provisions of the Specifications and Drawings and give them due effect, will be given by the Awarding Authority in writing.

D. STREAMLINING:

1. OMISSION OF WORDS AND PHRASES: The detailed Specification requirements are of abbreviated or "Streamlined" type and include incomplete sentences in order to avoid cumbersome and confusing repetition of expression. Omissions of words or phrases such as "the Contractor shall," "in conformity therewith," "as noted," "as indicated on the Drawings," or "according to the Drawings," are intentional. Omitted words or phrases will be supplied by inference. Wherever in the Specifications or upon the Drawings, APPROVED, AUTHORIZED, CONTEMPLATED, CONSIDERED NECESSARY, DEEMED NECESSARY, DESIGNATED, DIRECTED, GIVEN, ORDERED, PERMITTED, PRESCRIBED, REQUIRED, or words of like import are used, they shall be construed to mean and intended "by the Awarding Authority," and similarly, the words ACCEPTABLE, SATISFACTORY, or words of the like import shall be construed to mean acceptable to or satisfactory "to the Awarding Authority", unless otherwise expressly stated or the Contract clearly indicates another meaning.

   Words "furnish," "install," "perform," "provide," and "work" shall mean that the Contractor shall furnish, install, perform, provide, and connect up complete in operative condition and use all materials, equipment, apparatus, and required appurtenances of the particular item to which it has reference.

2. APPLICABLE PUBLICATIONS: References to standard specifications, associations, bureaus, organizations, or industries, and the like, shall mean the latest edition of such references adopted and published at date of the Advertisement for Bids.

3. **ADDITONAL DETAIL DRAWINGS AND INSTRUCTIONS:**

Further information and instructions may be issued and transmitted to the Contractor by the Awarding Authority during the progress of the Work by means of additional detail drawings, or otherwise as deemed necessary to make more clear or specific the Drawings and Specifications in the Contract Documents, when and as required by the Work. All such drawings and instructions shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom.

Any ambiguities, inconsistencies, conflicts, errors, omissions, deviations from industry standards or from manufacturer's recommendations, and/or discrepancies found between the Drawings and Specifications and site conditions shall be immediately reported in writing to the Awarding Authority who will promptly correct the same in writing. Any work done by the Contractor after its discovery of such ambiguities, inconsistencies, conflicts, discrepancies, errors, or omissions, and prior to receipt of written clarification or correction, shall be done at Contractor's own risk.

In case of a difference between small and large scale drawings, the large scale drawings shall govern.

Where, on any of the drawings, a portion of the Work is drawn out and the remainder is indicated in outline, the parts drawn out shall apply also to all other portions of the Work.

Where the word "similar" occurs on the Drawings, it shall be interpreted in its general sense and not as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the Work.

If the Contractor considers that any work is required in a manner to make it impossible to produce first-class work, or should ambiguities, inconsistencies, conflicts, errors, omissions, deviations from industry standards or from manufacturer's recommendations and/or discrepancies appear in or between any of the Contract Documents; the Contractor shall request interpretation, clarification, or correction before proceeding with such work. If Contractor fails to make such a request, no excuse will thereafter be entertained by the Awarding Authority for Contractor's failure to execute and complete the work in a correct and satisfactory manner.

Contractor shall have a continuing duty to read, carefully study, and compare each of the Contract Documents, the Shop Drawings, and Samples and product data and shall give written notice to the Awarding Authority of any inconsistency, ambiguity, conflict, discrepancy, error or omission, deviations from industry standards or from manufacturer's recommendations, which Contractor may discover with respect these documents before proceeding with the affected Work. The issuance or the express or implied approval by the Awarding Authority or Designer of the Contract Documents, Shop Drawings, or Samples and product data shall not relieve Contractor of the continuing duties imposed hereby, nor shall any such approval be evidence of Contractor's compliance with this Contract. The Awarding Authority has requested that Designer to only prepare documents for the Project, including Drawings and Specifications for the Project, which are accurate, adequate, consistent, coordinated and sufficient for construction. HOWEVER, AWARDING AUTHORITY MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO CONTRACTOR CONCERNING SUCH DOCUMENTS. By execution of the Contract Agreement, Contractor acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated, and sufficient for construction, and that Contractor has not, does not, and will not rely upon any representation or warranties by the Awarding Authority concerning such documents as no such representation or warranties have been or are hereby made.

4. **COPIES FURNISHED CONTRACTOR:**

Except as otherwise provided, all required copies of Drawings and Specifications for the execution of the Work will be furnished to the Contractor by the Designer without charge. Other copies requested will be furnished at reproduction cost. "Maximum 20 sets".

5. **SHOP DRAWINGS AND SUBMITTALS:**

The Contractor shall check the Contract Drawings for accuracy and verify with field measurements as necessary. Contractor shall submit to the Awarding Authority with its criticism and/or approval, all layouts, detail schedules, shop drawings, and setting or erection drawings as required by the Specifications or requested by the Awarding Authority for proper installation of materials, without causing delay in the Work. The Contractor shall read, carefully study, and check Subcontractors' shop drawings for accuracy and see that work contiguous with and having bearing on work indicated on shop drawings shall be dated, numbered consecutively, show working and erection dimensions and necessary details, and include complete information for connecting to other work. Any work required by shop drawings that is fabricated by the Contractor prior to approval shall be at its own risk.

All shop drawings and schedules, accompanied by a letter of transmittal containing project number, number of drawings, titles, or other pertinent data, shall be submitted to the Awarding Authority by Awarding Authority's approved method (hard copy, email, software etc.) to be dictated at the pre-construction meeting (with Contractor's approval thereon) sufficiently in advance of construction requirements to allow checking, correcting, re-submitting, and re-checking. Whenever necessary, due to receipt of a high volume of simultaneous submittals, the Designer shall notify the Contractor that submittal review must be prioritized and request the Contractor to provide said prioritization, in writing, of those simultaneous submittals based on the contractor's approved project schedule. This shall have the effect of staying the 21 day review requirement for the lower priority submittals. If shop drawings show variations from the requirements of the Contract Documents because of standard shop practice or other reasons, specific mention of such variations shall be made in the letter of submittal.

Satisfactory drawings will be so identified, dated, approved, and returned to the Contractor by the Awarding Authority. Should shop drawings be disapproved and returned to the Contractor by the Awarding Authority indicating corrections and changes to be made such corrections, changes, including design and artistic effect, shall be submitted to the Awarding Authority until final approval is obtained. No corrections or changes indicated on shop drawings will be considered as Extra Work. Contractor shall not perform any portion of the Work requiring submittal and review of shop drawings, product data or samples unless and until such submittal shall have been approved by the Designer.

The approval of shop drawings, schedules, and setting or erection drawings will be general and shall <u>not</u> be construed

A. as permitting any departure from contract requirements,

B. as relieving the Contractor of the responsibility for any error in details, dimensions, coordination with other work, or otherwise that may exist in shop drawings and schedules, or

C. as approving departures from drawings and specifications or from additional details or instructions previously furnished by the Awarding Authority unless Contractor has in writing called attention to such deviations at the time of submission and secured written approval.

Operation and Maintenance Manuals are considered submittals, and as such shall be submitted in the required format and in a timely manner for review and approval acceptance during the Project but no later than 30 days prior to contract completion date.

Shop drawings, product data and samples and other submittals from the Contractor do not constitute Contract Documents. Their purpose is merely to demonstrate the manner in which the Contractor intends to implement the Work in conformance with the information received from the Contract Documents.

6. **PROJECT AND RECORD DOCUMENTS:**

The Contractor shall keep on the site of the Work, and in good order, at least one set of its Contract Drawings including shop drawings, specifications, and all authorized change orders, and shall at all times give the Awarding Authority, and their representatives access thereto.

The Contractor shall also keep in his office on site of the Work one set of Contract Drawings and Specifications furnished by the Awarding Authority, herein referred to as RECORD DRAWINGS, on which shall be recorded all work as built or installed, and such other information as is specified or required. Contractor shall carefully draw and letter notes of explanation, in ink, on the Record Drawings, as a fully dimensioned record of all work. The Record Drawings, supplemented by any detailed sketches deemed necessary, shall indicate the work "AS-BUILT" and shall clearly designate all notations by "clouding" around the notation. The Contractor will be required to prepare new drawings if the indications on the Record Drawings or the detailed sketches are illegible or otherwise unsatisfactory for future reference. Each record or correction made on such drawings will be initialed and dated by the Contractor's Supervisor or Awarding Authority's Inspector. At the conclusion of the project and prior to final inspection and as a condition of final payment, the Contractor shall upload in pdf and CAD the approved as-builts with all changes/ASI's etc. incorporated to the Awarding Authority's preferred project site and transfer all "As-Built" information from the Record Drawings to the CAD and pdf files. These need to be signed by General Contractor, dated and marked "As-Builts." The Contractors shall also furnish "As-Builts" in the most current version of Autocad. (See Article 01700)

7. **OWNERSHIP OF DRAWINGS:**

All originals or duplicated Contract Documents, including the Drawings and Specifications, and other data prepared by the Awarding Authority or Designer, and copies thereof prepared and furnished to the Contractor are the property of the Awarding Authority.

Upon completion of the Work, all copies of the Drawings and Specifications, with the exception of two sets retained by the Contractor, shall be returned by the Contractor to the Awarding Authority.

8. **SAMPLES:**

The Contractor shall, without undue delay, furnish and submit to the Awarding Authority any samples which require the Awarding Authority's or Designer's approval, and also any samples which may be

requested by the Awarding Authority, of any and all materials or equipment Contractor proposes to use. All shipping charges on the samples shall be prepaid. Samples shall be furnished sufficiently in advance to allow the Awarding Authority reasonable time for examination, investigation, or consideration without delay to the Work.

The Contractor shall provide Subcontractors and prospective manufacturers, material dealers or suppliers with complete information of pertinent contract requirements and all transactions therewith shall be through the Contractor.

Contractor's use of materials or equipment in the Work prior to receiving any required sample approval of such materials or equipment shall be solely at the Contractor's risk and expense.

Each sample shall have a label indicating the material represented, its place of origin and the name of the producers, the Contractor, and the building or Work for which the material is intended. Where manufacturer's printed instructions for installation are required, duplicate copies of such directions shall be submitted with samples. Contractor's attention is directed to General conditions Article 50, USE OF FOREIGN MATERIALS.

A list of the samples, the name of the building or Work for which the materials are intended, and the brands of materials and names of the manufacturers shall accompany each sample transmission by the Contractor.

After a material has been approved by the Awarding Authority no additional samples of that material will be considered and no change in brand or make will be permitted.

Failure of any materials to pass required tests will be sufficient cause for refusal to consider any further samples of the same brand of make of that material for use in the Work.

Test samples, as the Awarding Authority may deem necessary, will be produced from the various materials delivered for use in the Work. If any of these test samples fail to meet the contract requirements, any previous approvals will be withdrawn and such materials shall be subject to removal and replacement by the Contractor with materials or equipment meeting the contract requirements. The Awarding Authority has the option to allow the defective materials to remain in place subject to proper credit or adjustment of the Contract Price as hereinafter set forth under General Conditions Article 21, DEDUCTIONS FOR UNCORRECTED WORK.

The costs of tests will be borne as specified in the Contract Documents.

9. **PROGRESS SCHEDULE AND CHARTS:**

The Contractor shall, within ten days after date of commencement and as directed in the earlier of either the Notice to Proceed, Letter of Intent, or other instrument, prepare and submit for the Designer and Awarding Authority's review and approval a Critical Path Method (CPM) type of schedule (in both electronic (not PDF) and hard format) showing the order in which the Contractor proposes to carry out the Work within the contract time. The CPM schedule shall include, among other detail, the date

Contractor will start the salient features of the Work, including, but not limited to, procurement of material, plant and equipment, startup, testing and acceptance, critical milestones, activity relationships and constraints, float, and the contemplated date of completion for the Work and each activity there under. The schedule shall be of sufficient detail to reflect all major aspects and constraints of the Work including, but not limited to, coordination with other trade packages and any information or action required by Designer and/or the Awarding Authority. The Designer and Awarding Authority's review and approval of the Contractor's construction schedule shall be only for compliance with the specified format, Contract Time, and suitability for monitoring progress of the Work and shall not be construed as a representation that the Designer or Awarding Authority has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.

The CPM schedule shall be in the form of a computerized flow chart per requirements in Specification Section 01320 Schedule. No claims for time extensions will be granted prior to the submission and approval of a progress schedule compliant with this or any other applicable section. Contractor shall provide licensed copies of software used to develop the schedule at no additional cost to the Awarding Authority. The Contractor shall regularly update the CPM schedule. At two-week intervals, contractor shall enter the actual percentage of completion and the actual start and finish dates on the construction schedule and deliver to the Awarding Authority two current copies showing planned and actual progress of the Work with each Application for Partial Payment. The construction schedule shall be revised to reflect any agreed extensions of the Contract Time or as required by conditions of the Work once Change Order with time extension is approved and executed.

The Contractor's construction schedule shall be used by the Contractor, Designer, and Awarding Authority to determine the adequacy of the Contractor's progress. The Contractor shall be responsible for maintaining progress in accordance with the currently approved construction schedule and shall increase the number of shifts, and/or overtime operations, days of work, and/or amount of construction plant as may be necessary to do so. If the Contractor's progress falls materially behind the currently approved construction schedule and, in the opinion of the Designer or Awarding Authority, the Contractor is not taking sufficient steps to regain schedule, upon written request Contractor shall submit for review by Designer and Awarding Authority such supplementary or revised construction schedules as necessary to demonstrate the manner in which the original rate of progress will be regained, all without additional cost to the Awarding Authority.

Failure by the Contractor to comply with these progress requirements in order to ensure completion within the Contract Time will be sufficient reason for the Awarding Authority to terminate the Contract or supplement the Contractor as provided elsewhere in the contract.

The Contractor's construction schedule shall begin with the date of commencement stated in the Notice to Proceed or Letter of Intent and conclude with the date of Substantial completion of the Work. Float or slack time within the construction schedule is **not** for the exclusive use or benefit of the Awarding Authority or of the Contractor, but is a resource available to both parties as needed to meet contract milestones and the contract completion date.

Pursuant to these float sharing requirements, no time extensions will be granted until a delay occurs which will impact the Work's critical path, consumes all float or contingency time available, and extends the Work beyond the contract completion date.

Whenever necessary, due to receipt of a high volume of simultaneous submittals, the Designer shall notify the Contractor that submittal review must be prioritized and request the Contractor to provide said prioritization, in writing, of those simultaneous submittals based on the contractor's approved project schedule. This shall have the effect of staying the 21 (twenty one) day review requirement for the lower priority submittals.

No extension of contract time will be granted for Owner delays concurrent with delays by the Contractor.

The Awarding Authority reserves the right to reduce the Contract Time to the time of completion shown on the Contractor's early completion schedule at no additional cost to the Awarding Authority.

Under no circumstances shall the Owner's acceptance of an early completion schedule be basis for the Contractor to claim additional costs, general conditions, or other claims for delay.

Should the contractor fail to submit a progress schedule in compliance with this section, the Owner may suspend work with no time extension granted.

10. **MATERIALS, EQUIPMENT, AND EMPLOYEES:**

Unless otherwise stipulated, the Contractor shall furnish all material, equipment, tools, labor, water, light, power, transportation, other services or facilities, and incidentals for the proper execution and completion of the Work. Unless otherwise stipulated, Contractor warrants that all materials, products, systems and equipment, including those purchased under the Purchasing Agent Agreement, incorporated in the Work shall be new and without apparent damage, be of quality equal to or higher than that required by the Contract Documents, be merchantable, and free of defects.

Contractor warrants all labor and services shall be performed in the best and most workmanlike manner by persons skilled in their respective assignments or trades, shall comply with the Contract Documents, and shall be free of defects. Workmen whose work is unsatisfactory, or who are considered unfit or unskilled, or otherwise objectionable, shall be removed from the Work.

Sales Tax- Bidders are not to include Sales, Use, or Severance Taxes in their bids.

Sales Tax Exempt Certificate- Under Alabama Act 2013-205, Certificate of Exemption from Sales and Use Tax for Governmental Entities, the Contractor is responsible for obtaining a Certificate of Exemption from the Alabama Department of Revenue for purchases of materials and other tangible personal property made part of the Project. Any subcontractors purchasing materials or other tangible personal property made part of the Project will be responsible for obtaining a Certificate of Exemption. It is the General Contractor's responsibility to comply with the law and the Department of Revenue regulations throughout the duration of the Project. Any delay in obtaining the Certificate(s) of

Exemption due in whole or in part to the fault of the Contractor or subcontractor will not be cause for an extension of time for completion of the Project nor an increase in price.

11. EQUIPMENT AND MATERIAL DEVIATIONS:

Every part of the Work shall be executed in a workmanlike manner in accordance with the Contract Documents and approved Submittals. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work and shall be new except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise.

Whenever a product, material, system, item of equipment, or service is identified in the Contract Documents by reference to a trade name, manufacturer's name, model number, etc. and only one or two sources are listed, or three or more sources are listed and followed by "or approved equal" or similar wording, it is intended to establish a required standard of performance, design, and quality, and the Contractor may submit, for the Architect's approval, products, materials, systems, equipment, or services of other sources which the Contractor can prove to the Architect's satisfaction are equal to, or exceed, the standard of performance, design and quality specified, unless the provisions of the final paragraph below apply. Such proposed substitutions are not to be purchased or installed without the Architect's written approval of the substitution.

If the Contract Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the Contractor must furnish the identified sole source.

12. ROYALTIES; PATENTS; AND COPYRIGHTS:

The Contractor shall pay all royalties and license fees. The Contactor shall defend all suits or claims for infringement of any copyright or patent right and shall hold and save harmless the Awarding Authority and its agents and employees from any liability or loss of any nature or kind, including cost and expenses, for or on account of any copyright or any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Awarding Authority.

If the Contractor has information that any process, article or item specified or delineated by the Contract Documents is an infringement of a patent or copyright, it shall promptly give such information to the Awarding Authority.

13. SURVEYS, PERMITS, LAWS AND REGULATIONS:

A. SURVEYS- The Contractor shall provide competent professional services to execute the Work in accordance with contract requirements. Contractor shall verify the figures given for the contours, approaches and locations shown on the Drawings before undertaking any construction work and be responsible for the accuracy of the finished work. Without extra cost to Awarding Authority, Contractor shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments outside the project site.

The Contractor shall establish all base lines for the location of the principal components of the Work and make all detail surveys necessary for construction, including slope stakes, batter boards and other working points, lines and elevations.

If the Contractor finds any errors or discrepancies, or that any previously established references have been destroyed or misplaced, Contractor shall promptly notify the Awarding Authority.

B. PERMITS- The Contractor shall obtain and pay for all licenses and permits and shall pay all fees charges for connection to outside service and the use of property, other than the site of the Work, required for the execution and completion of the Work.

C. LAWS- The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and building code requirements applicable to or bearing on the conduct of the Work unless in conflict with contract requirements. If the Contractor ascertains at any time that any requirement of the Contract Agreement is at variance with applicable laws, ordinances, regulations, or building code requirements, Contractor shall promptly notify the Awarding Authority and any necessary adjustments of the Contract Agreement will be made as hereinafter specified under General Conditions, Article 19, CHANGES IN THE WORK.

The Contractor shall have included in its bid price all Federal, State, and local taxes except taxes and assessments on the real property of the site of the Work and other taxes to be excluded under the terms of the bid documents. Wherever the law of the place of building requires a special tax not excluded by the terms of the bid documents, the Contractor shall have included in its bid price such taxes. (Refer to "Supplemental General Conditions" which may contain additional tax information).

D. UA PERMITTING, INSPECTION & CERTIFICATE OF OCCUPANY PROCEDURES- General Contractors shall follow the Permitting, Inspection & Certificate of Occupancy Procedure for University of Alabama Projects that is included in the Contract Requirements of the Front-End specifications.

14. **PROTECTION OF WORK AND PROPERTY AND NOISE CONTROL:**

The Contractor shall at all times adequately maintain, guard and protect its own work from damage, and safely guard and protect the Awarding Authority's property from injury or loss arising in connection with the Project. All damaged property of Awarding Authority shall be repaired or replaced with new similar property at Contractor's expense, including installation costs, at replacement value without deduction or reduction for depreciation. All repairs and replacements shall be done only upon approval of Awarding Authority whose decision shall be final.

Contractor shall adequately protect adjacent property as provided by law and Contract Documents. Any damage to existing structures or the interruption of utility services shall be repaired or restored promptly at the expense of the Contractor.

The Contractor shall protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site which are not required to be removed or do not unreasonably interfere with construction, and shall be responsible for all unauthorized cutting or damage of trees and shrubs, including damage of grass areas, due to careless operation of equipment or stockpiling of materials.

Care shall be taken by the Contractor in felling trees that are to be removed to avoid any unnecessary damage to vegetation or other trees that are to remain in place. Any limbs or branches unavoidably broken during such operations shall be trimmed with a clean cut and painted with an approved tree pruning compound. The Contractor may be required to replace or restore at its own expense all vegetation not protected and preserved, as above required, that may be destroyed or damaged.

The Contractor shall provide and maintain all passageways, guard fences, lights, and other facilities required for protection by state or municipal laws and regulations or local conditions.

The Contractor shall take the following steps if historical items, artifacts, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, may be encountered during demolition or excavation operations. These items remain the Owner's property. The following steps should be taken should any items be encountered on-site:

1. Operation should stop immediately and UA Construction Administration Project Manager and or Field Coordinator should be notified.

2. The Office of Archaeological Research will be contacted (205-371-2266) to document and catalogue and to remove and store each item or object in an appropriate professional manner to prevent damage.

3. Cooperate with Owner's archaeologist or historical adviser as required until the area identified that might contain additional items has been cleared.

4. Once the area is cleared, the construction activities can proceed in the normal process.

5. Contractor and Project Manager should immediately note and document the impact on the schedule and specifically the critical path.

The Contractor shall take all necessary precautions for the safety of public and employees on the Work and shall comply with all applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on or about or adjacent to the premises where the work is being performed.

The CONTRACTOR shall adequately provide protection to all surface and subsurface utilities including, but not limited to, existing valves, valve coverings, manholes, electrical equipment and other utility components within the Project site and adjacent property where work is being performed in relation to the Project. Protection should include, but is not limited to, locating, marking/flagging, barricading or other means necessary to avoid damage to all utility components. In the event a utility

component is damaged due to negligence by the CONTRACTOR, the CONTRACTOR shall immediately notify the UA Project Manager and diligently cooperate with the Awarding Authority until repairs are complete. All repairs and replacements shall be performed only upon approval of Awarding Authority whose decision shall be final.

In order to protect infrastructure, telecommunication, and all utilities during excavation the University and Contractors shall adhere to these guidelines:

1. The CONTRACTOR shall review and fully abide by the Awarding Authority's "Underground Utilities Locate Procedures" found in the Front End Documents as listed in the Table of Contents.

2. In the event timely notice of such excavation or digging is not given or if such notice is given but a telephone cable or network fiber is cut or damaged due to the negligence of the general contractor or subcontractor, the University will charge the general contractor the following amounts and may withhold from any accrued payments the amounts due.

   For Telecommunication Lines:

   Fiber:
   $ 5000 Service Interruption Fee
   $100 per fiber splice (i.e. the fiber is 30 pair, then 60 splices will be required)
   Plus cost of Material

   Copper:
   $5000 Service Interruption Fee
   Time – Rate is $35.00/manhour and $50.00/Overtime manhour
   Plus Cost of Material

   For All Other Utilities:

   Time and Material for cost of the repair to the utility, any loss of business or operational use, any UA necessary support of the event, and any quantifiable utility cost.
   The minimum charge of the event will be $1,000.

NOISE CONTROL

A. The Owner shall conduct baseline noise level monitoring prior to construction and periodic monitoring of noise levels during the construction. The Owner shall also conduct base line testing of all equipment delivered to the site for compliance of the 86 DBA at 50 feet guideline prior to commencing work.

B. The Contractor shall develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum. The Owner will make final interpretation concerning whether nuisance noise conditions exist.

C. The Contractor will schedule construction activities to avoid excessive noise during final exams, commencement, or other events. The Owner will identify the specified days in the bid documents.

D. The Contractor shall execute construction work by methods and by use of equipment which will reduce excess noise.

E. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations.

F. The Contractor shall manage vehicular traffic and scheduling to reduce noise. This includes, but is not limited to, vehicles or other equipment with back up alarms.

15. **CLIMATE CONDITIONS:**

The Contractor shall suspend any work that may be subject to damage by climatic conditions outside of the material manufacturer's specifications and/or industry standards.

16. **BUILDING ENVIRONMENTAL CONTROL:**

The Contractor shall provide, at its expense, all necessary equipment, utilities, fuel, safeguards and other requirements to maintain temperature and humidity control within the specifications and material manufacturer's stated tolerances as necessary to protect all work and materials against damage and installation failures until final acceptance of all Work in the Contract, unless the building or buildings are fully occupied by the Awarding Authority prior to such acceptance, in which case the Awarding Authority will assume all expense of maintaining building environmental control from the date of occupancy. The Contractor shall provide building environmental control including, but not limited to, the following:

A. at all times during the placing, setting, and curing period of concrete, sufficient temperature control to ensure the heating of spaces to not less than 50 F and not to exceed 90 F,

B. for the placing of interior wood finish work and throughout the placing of wood finish and other interior finishing, varnishing, painting, etc., appropriate building environmental control shall be in place for a period of ten days previous and until final acceptance of the Work,

C. provide temporary closures for windows, doors, and all temporary openings and take every reasonable precaution to prevent the escape of warm air from or entrance of cold air into the building in order to maintain appropriate building environmental control for the work taking place and commensurate with the final operating conditions,

D. provides such other protection as required under the specific material specifications in Divisions 2-16 of the Specifications or the manufacturer's recommendations.

17. **INSPECTION OF THE WORK:**

The Awarding Authority or any agency having jurisdiction, and their representatives shall, for inspection purposes, have access at all times to the Work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection.

All materials, workmanship, processes of manufacture, and methods of construction, if not otherwise stipulated, shall be subject to inspection, examination, and test by the Awarding Authority (or its duly authorized representatives) at any and all places where such manufacture and/or construction are being performed. The Awarding Authority shall have the right to reject defective material and workmanship or require its correction. Rejected workmanship shall be satisfactorily corrected, and rejected material shall be satisfactorily replaced with proper material, without charge therefor, and the Contractor shall promptly segregate and remove the rejected material from the premises.

The Awarding Authority may appoint or assign Inspectors, with designated duties and restricted authority, to inspect the work, or to make special inspections requested in advance by the Contractor, and to report the progress of the Work, and manner or procedure, quality of the material and workmanship, and compliance with the Contract Documents. Authorized inspectors shall have the authority to reject materials, workmanship, or equipment clearly defective or otherwise not in the accordance with the Drawings and Specifications, but neither the presence nor absence of such inspectors shall relieve the Contractor from fully complying with all of the contract requirements.

No inspector has authority to revoke, alter, relax, or waive any requirements of the Contract Documents; to finally approve or accept any portion of the Work or to issue instructions contrary to the Drawings and Specifications, nor shall any inspector supervise and direct work for the Contractor, nor unreasonably interfere with the Contractor's operations beyond the extent necessary to make certain that the Work is being carried out according to the contract requirements.

Any advice which an inspector may give to the Contractor shall not be, nor construed to be, as binding on the Awarding Authority in anyway, nor release the Contractor from its duty to comply with all of the contract requirements.

The Contractor shall furnish promptly, without extra compensation, all reasonable facilities, labor, services, equipment, and material necessary for safe and convenient access, inspection, and tests that may be required. All inspections and tests will be performed in such a manner as not to cause unnecessary delay of the Work. Special, full size and performance tests shall be as described in Sections of the Specifications. The Contractor may be charged any extra cost of inspection incurred by the Awarding Authority on account of material and workmanship not being ready at the time set by the Contractor for an inspection or test.

Should the Awarding Authority consider it necessary or advisable, at any time before final acceptance of the Work, to make an examination of work already completed by uncovering, or removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, services and material. If such work is found to be defective the Contractor shall defray all expense of such examination and of satisfactory reconstruction. If, however, such work is found to meet the

requirements of the Contract Documents, the work of examination and replacement will be considered and compensated for as Extra Work ordered by the Awarding Authority and, in addition, if completion of the Work has been delayed thereby, an extension of time will be granted for such delay.
In order for this project to be "Substantially Complete" the following is required: Awarding Authority's receipt of the pre-final closeouts; a final inspection held and the project declared "Substantially Complete", in writing, signed by the Architect (if applicable) and the Awarding Authority. "Substantial Completion" means the designated work is sufficiently complete, in accordance with the contract documents, such that the Awarding Authority may occupy or utilize the work for the use intended in a safe and unencumbered manner, as represented by the contract documents. The date of Substantial Completion is the date upon which the contract time stops and all warranties for the designated work commence. The attached form (Attachment B) will officially document the substantial completion date.

18. **SUPERINTENDENCE AND SUPERVISION:**

The Contractor shall continuously supervise, direct and coordinate the Work, using its best skill, effort, knowledge, and attention during performance of the work. Contractor shall employ and maintain at the Project only competent supervisory personnel. Contractor's superintendent(s), whose qualifications are acceptable to the Awarding Authority, shall be at the site at all times during construction activity, and shall be authorized to act for Contractor in its absence If, for reasonable cause, the Owner refuses to approve the individual, or withdraws its approval after once giving it, the Contractor shall name a different superintendent for the Owner's review and approval. Any disapproved superintendent will not perform in that capacity thereafter at the Project site.

The Contractor shall provide a sufficient and appropriate level of superintendence to prosecute the work with diligence and to ensure adequate oversight, management, and supervision given the complexity, phasing, size, and/or affected area of the project. The Superintendent(s) should be on site at all times when work is being performed and should be solely dedicated to the supervision and oversight of the work. Contractor's Superintendents(s) shall not be the primary operator of equipment or perform other tasks apart from or in addition to project supervision.

Unless otherwise indicated in the bid documents, Contractor shall provide onsite representation to respond to any issues which may arise during initial Owner occupancy/move-in.

The Awarding Authority reserves the right to credit the contract for any unreasonable or uncustomary absence of the Superintendent(s) from the site. The Contractor shall not remove from the work a superintendent who is satisfactory to both Contractor and the Awarding Authority, unless his employment is terminated. At the Awarding Authority's discretion, work may be suspended, with no extension to the contract time, until such time that a qualified replacement acceptable to the Awarding Authority is provided. Contractor shall be responsible to the Awarding Authority for any acts or omissions of the Contractor, its employees and others engaged in the Work on behalf of the Contractor.

Owner / Architect / Contractor (OAC) meetings shall be held bi-weekly ON CAMPUS until the project is determined "closed out" by the Awarding Authority. Project Superintendent (Contractor)

shall attend meetings until all punch list items are complete. Project Manager (Contractor) shall attend meetings until Awarding Authority has deemed project closed in accordance with 01700 Project Closeout.

In general, important verbal communications will be confirmed in writing to the Contractor, and these and other communications always upon written request of the Contractor.

The Contractor shall read, carefully study and compare all Drawings, Specifications, other instructions and related data, and promptly report in writing to the Awarding Authority, any ambiguity, conflict, inconsistency, discrepancy, error, omission, deviations from industry standards or from manufacturer's recommendations that it may discover. Contractor shall be liable for the performance and the cost of any necessary corrections resulting from adjustments or modifications of Contract Documents made without prior approval. If Contractor performs any of the Work knowing it involves a recognized error, conflict, inconsistency, discrepancy, or omission, deviations from industry standards or from manufacturer's recommendations, in the Contract Documents without notice to the Awarding Authority, the Contractors shall bear the responsibility for such performance and shall bear the cost of correction. If this condition is not observed, the Awarding Authority has the right to shut down the project immediately without any additional cost to the Awarding Authority.

19. **CHANGES IN THE WORK:**

A. GENERAL

1. The Owner at any time may make changes in the Work by changes in the Drawings and the Specifications of the Contract and within the general scope thereof. Changes will be in the form of a Contract Change Order based upon a written request of the Owner and a written proposal of the Contractor.

2. If the Owner directs a change in the work, the change shall be incorporated into the Contract by a Change Order prepared by the Architect and signed by the Architect, Contractor and Owner, acknowledging their agreement to the change or changes in the Work and the adjustments, if any, in the Contract Sum and Contract Time.

3. In advance of delivery of a fully executed Contracted Change Order, the Architect shall furnish to the Contractor a written authorization to proceed with an agreed change. However, such an authorization shall be effective only if it:

   (a) Identifies the Contractor's accepted or negotiated proposal for the change; and
   (b) States the agreed adjustments, if any, in Contract Sum and Contract Time; and
   (c) States that funds are available to pay for the change; and
   (d) Is authorized by the Owner

4. Subject to compliance with Alabama's Public Works Laws, the Owner may, upon agreement by the Contractor, incorporate previously un-awarded bid alternates into the Contract.

5. Consent of Surety will be obtained for all Contract Change Orders involving an increase in the Contract Sum greater than ten percent of the contract amount (bonded amount is the original contract amount plus ten percent).

6. Credits to the Owner for additive and deductive changes shall be governed by Article 19.B.2 and 19.B.3.

7. Changes in the Work shall be performed under applicable provisions of the Contract Documents and the Contractor shall proceed promptly to perform changes in the Work, unless otherwise directed by the Owner, through the Architect. When time is of the essence, and performance of the work is integral to the completion of other adjacent work, the Contractor must proceed immediately as directed by the Architect.

B. ADJUSTMENT OF CONTRACT SUM

1. METHODS: The adjustment of the Contract Sum resulting from a change in the Work shall be determined by one of the following methods, or a combination thereof, as selected by Owner.

   a) Lump Sum – By mutual agreement to a lump sum based on, or negotiated from, an itemized cost proposal from the Contractor. This amount shall be all-inclusive, covering direct costs, as well as any fees. Contractor shall furnish to the Owner an itemized breakdown of the quantities and prices to be used in estimating the value of any changes that might be ordered. For the purposes of this method, Contractor and Subcontractors, shall furnish, at a minimum, the following on their own letterhead; all material or vendor quotes (with quantities and unit cost), labor hours, labor rates, labor burdens (as defined in subparagraph 19.B.1.c.(vi), equipment, and any other relevant information necessary to analyze the quote. For the purpose of this method of determining and adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change such as, but not limited to, the cost of bonds, insurance, superintendence and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.
      (i) For the Party performing the work, the cost of the work, less any credits, shall have a maximum markup for Overhead and Profit of 10%.
      (ii) The prime contractor or upper-tier subcontractor's markup on work performed by lower-tier subcontractors will be based on the net increased cost to the prime contractor or upper-tier subcontractor, as applicable, and shall not exceed 10%. No more than 10% shall be added by each successive lower-tier subcontractor, if applicable, for a maximum of 20%.
      (iii) 19.B.1.a)(i) and 19.B.1.a)(ii) shall also apply to Time and Materials changes.

   b) Unit Price – By estimating the number of unit quantities of each part of the Work which is changed and then multiplying the estimated number of such unit quantities by the applicable unit prices, if any, set forth in the Contract, or other mutually agreed unit prices. However, if the unit price originally agreed on is do materially changed that application of

such unit price to quantities of Work proposed will cause substantial inequity to either party, the applicable unit price shall be equitably adjusted and agreed to in advance of performing the work.

c) Time and Materials – If the contractor and Owner cannot agree on the amount of the adjustment in the Contract Sum for the change, the Owner, through the Architect may order the Contractor to proceed with the change on a Time and Materials basis, but the net cost to the Owner shall not exceed the amount quoted in the Contractor's proposal. Such order shall state that funds are available to pay for the change. When the Contractor proceeds with the change in the Work on a force account basis, the Contractor shall be reimbursed for reasonable expenditures incurred by the Contractor and its Subcontractors in performing added Work and the Owner shall receive reasonable credit for any deleted Work. The Contractor shall keep and present, in such form as the Owner may prescribe, and itemized accounting of the cost of the change together with sufficient supporting data. Unless otherwise stated in the directive, the adjustment of the Contract Sum for Time and Materials shall be limited to the following:

(i) cost of labor and supervision – at a minimum all labor should be detailed as follows: name, classification, date, daily hours, total hours and extensions for such laborers, Contractor shall submit copies of actual payrolls if requested;
(ii) cost of materials, supplies and equipment, including cost of delivery, whether incorporated of consumed;
(iii) rental cost of machinery and equipment, not to exceed prevailing local rates if contractor owned;
(iv) changes to be governed by Article 19.B.2 and 19.B.3;
(v) costs of permits and fees related to the change in the Work;
(vi) job labor burden is defined as follows: workers compensation insurance, FICA, federal and state unemployment insurance, retirement plan, and health insurance (single coverage only; no dental or vision), unless mutually agreed upon in writing within ten (10) days of the start of work.
(vii) Contractor shall submit proof of payment for burdens if requested.

2. ADDITIONS TO THE CONTRACT AMOUNT: The contract sum under any of the three (3) methods shall include the Contractor's direct cost plus a reasonable markup for overhead (as defined in 19.B.4 below). Overhead and profit for all changes shall be calculated in accordance with 19.B.1.a). Where subcontract work is involved, the total markup for shall not exceed the amount defined in 19.B.1.a). When the contractor's or subcontractor's portion of a change order request involves credit items, such items must be deducted prior to adding overhead and profit for the party performing the work. The contractor's fee is limited to the net increase to contractor or subcontractors' portions cost computed in accordance herewith.

3. DEDUCTIONS TO CONTRACT AMOUNT: When a change order request involves credit items only, a proper measure of the amount of downward adjustment in the contract prices is the reasonable cost to the contractor or subcontractor if they had performed the delegated

work. A reasonable allowance for overhead and profit are properly includable as part of the downward adjustment of a deductive change. The amount of such allowance is negotiable.

4. MARKUPS AND OVERHEADS: For the purpose of determining an adjustment of the Contract Sum, "overhead" shall cover all of the Contractor's indirect costs, such as, but not limited to: the cost of insurance and bonds, superintendence and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, home office expenses; and all other indirect costs. No markups will be allowed on markups.

C. ADJUSTMENT OF CONTRACT TIME

1. If the Contractor determines that additional time is necessary resulting from the changes in the Work they shall notify the Owner and Architect in writing at the same time they give the Owner and Architect their cost proposal. Such notification shall explain in detail why they are requesting an extension in time. Such detail shall show at a minimum how the change affects the project's Critical Path. The Contractor shall utilize the most current CPM schedule to justify any extension of time. Should the Contractor fail to provide the Owner with an acceptable schedule within the time limits specified in the contract documents, the request will not be considered.

2. A cumulative extension of time will not be allowed for changes in the work that result in concurrent delays nor will time be allowed for changes concurrent with contractor delays.

3. Owner and Architect shall determine if an extension in time is necessary per the detail Contractor provides. They shall notify the Contractor in writing of their decision.

D. CHANGE ORDER PROCEDURES

1. OWNER PROPOSED:

   (a) If the Owner proposes to make changes in the Work, the Architect or Owner will request that the Contractor provide a cost proposal for making the change to the Work. The request shall be in writing and shall describe the proposed change by drawings, specifications, narrative or a combination thereof.

   (b) Within 10 days after receiving such a request, or such other time as may be stated in the request, the Contractor shall prepare and submit to the Architect a written proposal, properly itemized and supported by sufficient substantiating data to facilitate evaluation. The time may be extended only if, within that time, the Contractor makes a written request with a reasonable justification thereof.

2. CONTRACTOR PROPOSED:

(a) The Contractor may voluntarily offer a change proposal which, in the Contractor's opinion, will reduce the cost of the construction, maintenance or operation or will improve the cost-effective performance of an element of the Project.

(b) The Owner, through the Architect, will accept, reject or respond otherwise within 21 days after receipt of the proposal, or such other reasonable time as the Contractor may state in the proposal.

(c) If the Contractor's proposal is acceptable to the Owner, or is negotiated to the mutual agreement of the Contractors and Owner, the Architect will prepare an appropriate Contract Change Order for execution. The Contractor shall then proceed as described in 19.A.7 above.

E. CONCEALED CONDITIONS

1. If the Contractor discovers conditions in the course of the work which are at a variance with the conditions indicated in the contract documents, notice must be given within 48 hours of the first observance of the condition in question.

2. If Contractor believes these conditions will add cost or time to the work it shall immediately begin to keep and maintain detailed, accurate and complete daily records concerning every detail of the potential claim.

3. The failure of the Contractor to keep such timely, detailed records shall be deemed to be a wavier by the Contractor of any claim based on concealed conditions.

F. PERFORMANCE PENDING PAYMENT RESOLUTION

1. If disagreements arise between the parties concerning the Change Order and any increase or decrease in the Contract Amount or lengthening or shortening of the contract time, the Contractor shall not suspend performance of the change in the Work itself unless ordered to do so by the Owner in writing. However, the Owner shall pay the Contractor an amount that the Owner estimates to be reasonable value for the change in the Work, regardless of the disagreement, if the change in the Work results in any increase in the contract amount. The Owner shall also have the right to decrease the contract amount by an amount the Owner estimates to be a reasonable value for the change in the Work, regardless of the disagreement, if the change in the Work results in decrease in the contract amount.

2. Pending agreement of the parties of final resolution of any dispute of the total amount due the Contractor for a change in the Work, amounts not in dispute for such changes in the Work may be included in Applications for Payment accompanied by an interim Change Order indicating the parties' agreement with part of all of such cost or time extension. Once a dispute is resolved, it shall be implemented by preparation and execution of an appropriate Change Order.

G. AUDIT RIGHTS

If any changes to the Work results in an increase in Contract Amount the Contractor shall provide, and shall require its subcontractors to provide, access to the Owner at all reasonable times to any books, correspondence, receipts, vouchers, instructions, memoranda and records of any kind relating thereof, all of which shall be maintained by the appropriate party for a period of two (2) years commencing from the date Owner makes payment to Contractor for such Change in the Work. The Contractor authorized the Owners, and shall require its Subcontractors to authorize the Owner, to confirm balances due and/or paid for the change in the Work, and to obtain sworn statements and waivers of liens, all to be done if Owner so elects.

20. CLAIMS FOR EXTRA COST OR EXTRA WORK:

If the Contractor claims that any instructions, by drawings or otherwise, are not in accordance with the Contract Documents, and involve extra work under the Contract, Contractor shall give the Awarding Authority written notice thereof within seven (7) days after receipt of such instructions, and in any event before proceeding to execute the work, and the procedure for determining the cost of extra work shall be as provided above under General Conditions, Article 19, CHANGES IN THE WORK. The giving of written notice within seven (7) days after receipt of the instructions giving rise to such claim is a condition precedent to any liability of the Awarding Authority thereof. The failure by the Contractor to give such notice and to give such notice prior to executing the Work shall constitute a waiver of any claim for payment for extra work. In connection with any claim by the Contractor against the Awarding Authority for compensation for extra work, any liability of the Awarding Authority for the Contractor's cost shall be strictly limited to direct costs incurred by the Contractor and shall in no event include indirect costs or consequential damages of Contractor. The Awarding Authority shall not be liable to the Contractor for claims of third parties, including Subcontractors, unless and until liability of the Contractor has been established thereof in a court of competent jurisdiction.

Should concealed and unknown conditions encountered in the performance of the Work below the surface of the ground or in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown conditions of an unusual nature differing materially from those ordinarily encountered in the area and generally recognized as inherent in the Work of the character provided for in the Contract Documents be encountered, the compensation to be paid for the Work shall be equitably adjusted by Change Order pursuant to Article 19 of the General Conditions upon written notice and claim by either party made within seven (7) days after the first observance of the condition. As a condition precedent to the Awarding Authority having any liability to the Contractor for concealed and unknown conditions, the Contractor must give Awarding Authority and Designer written notice of, and an opportunity to observe, the condition prior to disturbing it. The failure of Contractor to make the written notice and claim as provided in this paragraph shall constitute a waiver by the Contractor of any claim arising out of or relating to such concealed or unknown condition.

21. **DEDUCTIONS FOR UNCORRECTED WORK:**

If the Awarding Authority deems it expedient to correct work injured or installed at variance with the contract requirements, the Awarding Authority may, if it finds it to be in its interest, allow part or all of such work to remain in place, provided and equitable deduction from the contract price is offered by the Contractor.

22. **DELAYS; EXTENSION OF TIME:**

Delays: If the Contractor is delayed in progressing any task which at the time of the delay is then critical, as set forth in the Contractor's Critical Path Method schedule approved by the Awarding Authority and Designer under Article 9, or which during the delay became critical, as set forth in the Contractor's Critical Path Method schedule approved by the Awarding Authority and Designer under Article 9, as the sole result of an act or omission of the Awarding Authority or of any other contractor on the site employed by the Awarding Authority, by strikes, lockouts, fires, abnormal floods, tornadoes, or other cataclysmic phenomenon of nature, or by causes beyond the Contractor's control, then Contractor may be entitled to an extension of time, conditional that the Contractor does not experience a concurrent delay, in which to complete the Work, provided however, that the Contractor shall give written notice of such cause to the Awarding Authority not more than seven (7) days after the occurrence of the event or the first appearance of the condition giving rise to the claim and shall set forth in detail the Contractor's basis for requiring additional time in which to complete the Work. Such time extensions shall only be allowed upon approval of the Awarding Authority. The failure of the Contractor to give such notice within seven (7) days shall constitute a waiver of any claim for an extension of time in which to complete the Work.

Extensions of time shall not be approved for delays due to rain, wind, flood, or other natural phenomenon of normal intensity for the locality, as defined by the NOAA 30-year average for the City of Tuscaloosa and as measured at the project site, nor for any delay occurring more than seven (7) days before written claim therefor is submitted by the Contractor. Extensions of time shall not be approved unless the timing of the event actually and adversely impacts the scheduled work. Additionally, no extension of time will be approved for any disruption to site accessibility for annually recurring events at the University of Alabama. Such events include but are not limited to home athletic events, graduation ceremonies, and residential move in/out days.

Extension of Time: In the event any material changes, alterations or additions are made to the Work which will require additional time for the execution of any work under the Contract Agreement, the time of completion of the work may be extended by such a period of time as may be approved by the Awarding Authority, provided that in such case the Contractor shall make a written request for a time extension to the Awarding Authority within seven (7) days after being notified in writing of such material changes, alterations or additions. No extensions of time shall be given for any minor changes, alterations or additions in the Work. The failure by Contractor to make such written request for a time extension within seven (7) days shall constitute a waiver of any claim for an extension of time in which to complete the Work. The Contractor shall not be entitled to any reparation or compensation on account of additional time or extensions of time required for the execution of the Work.

23. **CORRECTION OF WORK BEFORE FINAL PAYMENT:**

Any defective work, whether the result of poor workmanship, the use of defective materials, damage through carelessness of the Contractor or its employees, or any other cause, shall be removed from the premises within ten (10) days after written notice is given by the Awarding Authority, and promptly replaced and re-executed by the Contractor in accordance with the Contract requirements and without expense to the Awarding Authority. The Contractor shall also bear the expense of making good all work of the Awarding Authority or its other contractors destroyed or damaged by such removal and replacement.

24. **CORRECTION OF WORK AFTER FINAL PAYMENT:**

Verification and approval of the Final Application for Payment and the making of the Final Payment by the Awarding Authority shall not relieve the Contractor of responsibility for faulty materials or workmanship. The Awarding Authority shall promptly give notice of observed defects due to faulty materials or workmanship, and any damage to other work resulting therefrom. In accordance with the terms of any general or special guarantees provided in the Contract, the Contractor shall promptly replace any such defects discovered within one year from the date of written acceptance of the Work or Final Payment therefor, whichever is prior.

25. **AWARDING AUTHORITY'S RIGHT TO CORRECT DEFICIENCIES:**

Upon failure or neglect by the Contractor to properly prosecute or perform the Work in accordance with the Contract Documents, including any requirements with respect to the CPM schedule and/or progress charts, and after ten (10) days written notice to the Contractor by the Awarding Authority, the Awarding Authority, without prejudice to any other remedy it may have, may correct such deficiencies and may deduct the actual cost thereof from payment then or thereafter due to the Contractor.

In instances where the Contractor's failure to properly prosecute and perform the Work in accordance with the Contract Documents has an actual, or imminent potential, adverse effect on public health, safety, convenience, or property, the Awarding Authority may, after four (4) hours notice to the Contractor, and without prejudice to any other remedy it may have, correct such deficiencies and may deduct the actual cost thereof from payment then or thereafter due to the Contractor.

The Awarding Authority reserves the right to require the Contractor to provide, at Contractor's expense, a warranty bond for items not installed per the Contract Documents that may impair or reduce the reasonably expected service life of the building or related components or systems.

26. **AWARDING AUTHORITY'S RIGHT TO TERMINATE CONTRACT:**

A. <u>TERMINATION FOR CAUSE</u>

If the Contractor should be adjudged a bankrupt, or if Contractor should make a general assignment for the benefit or its creditors, or if a receiver should be appointed on account of Contractor's insolvency, or if Contractor should persistently or repeatedly refuse or fail, except in cases for which an extension of time is provided, to supply enough properly skilled workmen or proper materials, or if Contractor should fail to make prompt payment to Subcontractors for material or labor, or persistently disregard laws, ordinances, or the instructions of the Awarding Authority or Designer, or should otherwise be guilty of a substantial violation of any provision of the Contract, then the Awarding Authority, after giving the Contractor and its Surety, ten (10) days written notice, may, without prejudice to any other right or remedy, terminate the employment of the Contractor and take possession of the premises and of all material, tools, equipment, and appliances thereon and finish the Work by whatever method the Awarding Authority may deem expedient. In such cases the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the Work, including compensation for additional architectural, engineering, managerial, and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Awarding Authority upon demand.

B. TERMINATION FOR CONVENIENCE

1. The Awarding Authority may, without cause and at any time, terminate the performance of Work under the Contract in whole, or in part, upon determination by the Awarding Authority that such termination is in the Awarding Authority's best interest. Such termination is referred to herein as Termination for Convenience.

2. Upon receipt of a written notice of Termination for Convenience from the Awarding Authority, the Contractor shall:
   a) stop Work as specified in the notice;
   b) enter into no further subcontracts or purchase orders for items such as, but not limited to, materials, services, or facilities, except as may be necessary for Work directed to be performed prior to the effective date of the termination or to complete Work that is not terminated;
   c) terminate all existing subcontracts and purchase orders to the extent they relate to the terminated Work;
   d) take such actions as are necessary, or directed by the Architect or Awarding Authority, to protect, preserve, and make safe the terminated Work; and
   e) complete performance of the Work that is not terminated.

3. In the event of Termination for Convenience, the Contractor shall be entitled to receive payment for the Work performed prior to its termination, including materials and equipment purchased and delivered for incorporation into the terminated Work, which are the property of the Owner. Contractor shall also be entitled to receive payment for any reasonable and customary costs directly related to the termination and calculated in a manner consistent with Article 19, Changes in the Work. The Contractor shall not be entitled to receive payment for any profits anticipated to have been gained from the terminated Work. A proposal for

decreasing the Contract Sum shall be submitted to the Architect by the Contractor in such time and detail, and with such supporting documentation, as is reasonably directed by the Awarding Authority. Final modification of the Contract shall be by Contract Change Order pursuant to Article 19.

27. **CONTRACTOR'S RIGHT TO TERMINATE THE CONTRACT:**

If the Work should be stopped under an order of any court, or other public authority, for a period of ninety (90) days, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, after fourteen (14) days' written notice to the Awarding Authority, terminate this Contract and the Awarding Authority will reimburse the Contractor for all work properly executed and any loss sustained upon any plant or materials and any other proper item of damage.

28. **APPLICATIONS FOR PARTIAL AND FINAL PAYMENTS:**

A. PAYMENT APPLICATIONS- Unless otherwise provided in the "Supplemental General Conditions" or the "Contract Agreement", the Awarding Authority will make partial payments to the Contractor within twenty (20) official UA business days from the date of a properly submitted and duly certified and approved estimate of work as prepared by the Contractor on an Application for Payment form approved by the Designer and the Awarding Authority and submitted to the Awarding Authority.

Contractors shall accept Electronic Funds Transfer (Direct Deposit) in lieu of paper checks unless otherwise indicated.

B. SCHEDULE OF VALUES- The Contractor shall, within ten (10) days after the Notice to Proceed, submit to the Awarding Authority with the Application for Payment form, a complete breakdown or schedule of values of the contract price showing the value assigned to each of the various parts of the Work, including an allowance for overhead and profit, aggregating the total contract price, and divided to facilitate payments to Subcontractors. Where Labor and Materials are both involved with the prosecution of the Work they shall be listed separately on the Contractor's Schedule of Values to the approval of the Architect and UA Project Manager. Upon approval by the Awarding Authority, this breakdown of the contract price, unless later found to be in error, shall be used as a basis for all Applications for Payment. The Contractor shall supply with its schedule of values such data as the Designer and Awarding Authority may require to substantiate its accuracy. The Contractor shall not imbalance its schedule of values nor artificially inflate any element thereof.

C. DRAFTS- The Contractor shall provide, no later than the last OAC of the month, a draft of the pay request for the period to be reviewed by the Architect/Engineer and Awarding Authority. This draft, and subsequently the approved pay application, shall have attached all items listed on the General Contractor's Pay Request Check List.

D. STORED MATERIAL - An Application for Partial Payment shall include the Contractor's cost of materials not yet incorporated in the Work, but delivered and suitably stored with adequate and

reasonable care and control to protect against loss or damage. This includes materials stored both on-site and off-site. For materials stored off-site the Contractor shall provide proof of property or other suitable insurance in an amount equal to or greater than the cost of said stored materials as well as photographs, invoices, or other documentation deemed appropriate by the Awarding Authority of said materials with their Application for Partial Payment. The Awarding Authority reserves the right to observe and monitor the off-site stored materials. During the fabrication/manufacturing process any loss of materials or damage would be the responsibility of the property insurance carrier at the off-site location where fabrication/manufacturing is taking place.

E. RETAINAGE- In making partial payments, there shall be retained five percent on the estimated amounts complete plus stored material until completion of 50 percent of the contract, after which no additional retainage will be withheld. This retainage will be held by the Awarding Authority until final completion, advertisement, and acceptance of all work covered by the Contract, when Final Payment of the entire balance found to be due will be made.

The Contractor, immediately after being notified by the Awarding Authority that all other requirements of the Contract Documents have been completed, as evidenced by the Certificate of Substantial Completion, shall give notice of said completion by an advertisement for a period of three (3) consecutive weeks in a newspaper of general circulation published within the county where the Work was performed, on a website maintained by the newspaper of general circulation in the county in which work was performed, or on the Owner's website . Proof of publication of said Notice shall be made by affidavit of the publisher or website owner and provided by the Contractor to the Awarding Authority with a printed copy of the Notice published included in the closeout documents. Final Payment shall be due as noted by the Awarding Authority's verification of the Final Application for Payment, but not sooner than 30 days after the completion of the advertisement or notice .

29. **VERIFICATION, CERTIFICATION AND APPROVALS FOR PAYMENT:**

When the Contractor has made application for Partial or Final Payment, the Awarding Authority shall verify the Application for Payment and shall make payment to the Contractor for such amount as the Awarding Authority determines to be properly due, or state in writing to the Contractor the Awarding Authority's reasons for withholding verification and payment in whole or in part.

No such verification nor payment made to the Contractor, nor partial or entire use or occupancy of the work by the Awarding Authority shall be an acceptance of any work or materials not in accordance with the Contract.

All materials and work covered by partial payments made shall become the sole property of the Awarding Authority, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work or as a waiver of the Awarding Authority's right to require the fulfillment of all the terms of the Contract Documents by the Contractor.

30. **PAYMENTS WITHHELD:**

A. The Awarding Authority may withhold payment of the whole, or any part, of a verified or approved Application for Payment to the extent necessary to protect it against loss on account of any of the following causes discovered subsequent to its verification or approvals:

1. Defective Work not remedied by the Contractor nor, in the opinion of the Awarding Authority, likely to remedied by Contractor;

2. Evidence indicating probable filing of claims by other parties against the Contractor;

3. Failure of the Contractor to promptly make payments to Subcontractors, or for materials labors, foodstuffs, and supplies;

4. Damage to another contractor under a separate contract with the Awarding Authority;

5. Evidence indicating probable filing of claims by third parties against the Awarding Authority or the Awarding Authority's property;

6. A dollar value will be assessed for final inspection punchlist items and held in addition to retainage until completed;

7. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance is insufficient to cover applicable liquidated damages.

B. When the above causes are removed, payments withheld will then be paid.

C. The Awarding Authority shall have the right to withhold from payments due to the Contractor under this Contract an amount equal to any amount which the Contractor owes the Owner under another Contract.

31. **CONTRACTOR AND SUBCONTRACTOR INSURANCE:**

Before any work can be started, Contractor must have a Certificate of Insurance approved by UA with the proper limits, certificate holder(s), and additional insured language as found in the "Insurance Requirements" specification section and modified by any addenda issued during the bid process or as required by UA.

With each pay request, the General Contractor shall include or have on file a current Certificate of Liability Insurance which meets the requirements set out in the UA Insurance Requirements for Contractors.

32. **CONTRACT BONDS:**

In order to insure the faithful performance of each and every condition, stipulation, and requirement of the Contract, and to indemnify and save harmless the Awarding Authority from any and all damages, either directly or indirectly, the successful Bidder to whom the Contract is awarded shall, within fifteen (15) calendar days after the Contract Agreement has been presented to Contractor for signature, unless otherwise stipulated, furnish at its own expense, and file with the Awarding Authority, an acceptable Surety Bond in an amount equal to one hundred (100%) percent of the contract price of the Contract as awarded. Said Bond shall be made on the approved bond form, shall be furnished by a reputable surety company authorized to do business in the State of Alabama, shall be countersigned by an authorized agent resident to do business in the State of Alabama, shall be countersigned by an authorized agent resident in the State who is qualified for the execution of such instruments, and shall have attached thereto power of attorney of the signing official. In case of default on the part of the Contractor, all expenses incident to ascertaining and collecting losses suffered by the Awarding Authority under the Bond, including architectural, engineering, administrative, and legal services shall lie against the Contract Bond for Performance of the Work.

In addition thereto the successful Bidder to whom the Contract is awarded shall, within fifteen (15) days after the Contract Agreement has been presented to Contractor for signature unless otherwise stipulated, furnish at its expense, and file with the Awarding Authority, an acceptable surety bond for Payment of Labor, Materials, Feedstuffs, and Supplies payable to the Awarding Authority in amount not less than fifty (50%) percent of the contract price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, materials, feedstuffs, or supplies for, or in, the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in suits on said bond. The date of neither bond shall be earlier that the date of the Contract Agreement.

Bonds shall remain in force during the entire guarantee period stipulated in General Conditions, Article 24 CORRECTION OF WORK AFTER FINAL PAYMENT.

33. **DAMAGES:**

Should either party to the Contract suffer damages because of any wrongful act or neglect of the other party, or of anyone employed by it, claim shall be made in writing to the other party within a reasonable time of the first observance of such damage, and not later that the date of the Application for Final Payment, excepts as expressly stipulated otherwise in the case of faulty work or materials.

34. **CLAIMS:**

Neither the Final Payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Awarding Authority a complete release of all claims arising out of the Contract, or receipts in lieu thereof and, if required in either case, an affidavit that so far as Contractor has knowledge or information the releases and receipts include all the labor and material for which a claim could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Awarding Authority, to indemnify him

against any claims. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Awarding Authority all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.

35. **ASSIGNMENT:**

The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Awarding Authority, nor shall the Contractor assign any monies due or to become due to it hereunder without the previous written consent of the Awarding Authority.

36. **MUTUAL RESPONSIBILITY OF CONTRACTORS**

If the Contractor or any of its Subcontractors cause any loss or damage to any separate contractor with a prior, concurrent, or subsequent contract on the Work or on the site, or cause any undue delay to such separate contractor on the Work or on the site, and if such contractor makes claim against the Awarding Authority, on account of any loss so sustained, the Awarding Authority shall notify the Contractor who shall indemnify and save harmless the Awarding Authority against any expenses arising therefrom.

37. **SEPARATE CONTRACTS:**

The Awarding Authority may award other contracts for additional new construction, buildings or equipment, or for reconstruction, alteration, equipment, and improvements of existing buildings on the site, and the Contractor shall fully cooperate in the storage of materials and the detailed execution of work, coordinate and integrate its operations with such other contractors, and carefully fit its own work to that provided under other contracts. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor. The Contractor, including its Subcontractors, shall keep informed of the progress and the detail work of other contractors and shall notify the Awarding Authority immediately of lack of progress or defective workmanship on the part of other contractors, where such delay or such defective workmanship will interfere with its own operations of the Work.

38. **SUBCONTRACTS:**

The apparent low bidder shall submit in writing to the Awarding Authority Project Manager for approval the names of the Subcontractors proposed for the Work within 48 business hours from bid date and time. Subcontractors that have been approved may not be changed thereafter except with the approval of the Awarding Authority. With this same submittal, Contractor shall also submit said subcontractor's Labor Burden Rate (as defined in Article 19.B.1.c.vi) for approval by the Awarding Authority.

The Contractor shall not engage any subcontractor to whom the Awarding Authority may have a reasonable objection, but it will not be required to engage any subcontractor against whom Contractor itself has a reasonable objection.

The Contractor shall be as fully responsible to the Awarding Authority for the acts and omissions of Subcontractors, and of persons employed by them, as Contractor is for the acts and omissions of persons directly employed by it.

Nothing contained in the Contract Documents shall create, or be construed as creating, privity of contract or any contractual relationship or agreement between the Awarding Authority and any Subcontractor, person or entity other than the Contractor.

39. RELATIONS OF CONTRACTOR AND SUBCONTRACTORS AND VENDORS:

The Contractor shall cause appropriate provisions to be inserted in all Subcontracts and Purchase Orders, including those items purchased under the Purchasing Agent Agreement, relative to the Work, to bind Subcontractors and Vendors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors and Vendors, and which require the Subcontractor and Vendor to assume all obligations and responsibilities to the Contractor, including the safety of the Subcontractor's work, which the Contractor owes the Awarding Authority under the Contract Documents and giving the Contractor any rights against the Subcontractor and Vendor that correspond to the rights afforded the Awarding Authority against the Contractor under the Contract Documents, including the same power of terminating any Subcontractors or Vendors that the Awarding Authority may exercise over the Contractor under any provisions of the Contract Documents.

The Articles, Divisions, Sections, or Paragraphs of the Specifications are not intended to control the Contractor in dividing the work among Subcontractors or Vendors or to limit the work performed by any trade.

The Contractor shall be solely responsible for the coordination of Subcontractors, of the trades, and materialmen engaged upon the Work.

The Contractor, without additional expense to the Awarding Authority, shall utilize the services of specialty subcontractors on those parts of the Work which are specified to be performed by specialty subcontractors.

The Awarding Authority will not undertake to settle any differences between the Contractor and its Subcontractors or Vendors or between Subcontractors.

40. DESIGNER'S STATUS:

Should a Designer's services be used the following describes its status. The Designer named in the Contract Documents, who prepared and furnished the Working Drawings and the Specifications contained therein, will prepare details and explanatory drawings, and provide instructions during the progress of the Work for transmittal by the Designer or Awarding Authority as above set forth under General Conditions, Article 3, ADDITIONAL DETAIL DRAWINGS AND INSTRUCTIONS. Designer will make its check of manufacturers' data and shop drawings submitted by the Contractor for the Work as set forth under General Conditions, Article 5, SHOP DRAWINGS.

The Designer, if employed by the Awarding Authority to do so, will endeavor to require the Contractor to strictly adhere to the plans and Specifications, to guard the Awarding Authority against defects and deficiencies in the work of the Contractor, and shall promptly notify the Awarding Authority in writing of any significant departure in the quality of materials or workmanship from the requirements of the plans and Specifications, but Designer does not guarantee the performance of the Contract.

The Designer shall not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, unless spelled out in the Contract Documents, and Designer shall not be liable for results of the Contractor's failure to carry out the Work in accordance with the Contract Documents.

The Designer shall not be responsible for the acts or omissions of the Contractor, or any Subcontractors, or any of the Contractor's or Subcontractor's agents or employees, or any other persons performing any of the Work.

41. **DESIGNER'S CHOICE:**

The Designer's decisions in matter relating to the artistic effect of its work shall be final, if within the other terms of the Contract.

42. **AWARDING AUTHORITY'S DECISIONS:**

Except as hereinabove provided, any dispute, claim, or question concerning the interpretation or meaning of the Contract Documents, or concerning a breach of the Contract, shall be submitted in writing to the Awarding Authority and its decision shall be returned to the Contractor in writing.

43. **ALLOWANCES:**

A. CASH ALLOWANCES No cash allowances shall be included in the contract price, unless specifically set forth under SUPPLEMENTAL GENERAL CONDITIONS or MODIFICATIONS OF THE GENERAL CONDITIONS or ALLOWANCES in the Specifications. When so included, the Contractor shall include in the contract price all allowances named therein and shall procure any and all items or work covered by such allowances as directed by the Awarding Authority and Designer. The Contractor shall, in compliance with state and federal law, afford the Awarding Authority the economy of competitive pricing from responsible bidders for allowance items unless purchasing procedures are specified in the Contract Documents.

Unless otherwise provided in the Contract Documents:

(1) allowances shall cover the cost to the Contractor of materials and equipment delivered to the Project site and all applicable taxes remaining after purchases are made under the Purchasing Agent Agreement, less applicable trade discounts;

(2) the Contractor's costs for unloading, storing, protecting, and handling at the site, labor,

installation, overhead, profit and other expenses related to materials or equipment covered by an allowance shall be included in the Contract Sum but not in the allowances;

(3) if required, the Contract Sum shall be adjusted by Change Order to reflect the actual costs of an allowance.

Any procurement of materials or equipment required by the Architect or Owner under an allowance shall be made in sufficient time to avoid delay of the Work.

B. LUMP SUM ALLOWANCES

(1) Allowance shall include the cost to the Contractor of specific products and materials ordered by Owner or selected by Designer under the allowance and shall include insurance, freight, equipment rental and delivery to project site.

(2) Use the lump sum allowance only as directed by Designer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

(3) Contractor's overhead and profit for work or products executed under the allowance are to be included in **the base or alternate bid and not in the allowance**.

(4) At Project closeout, **credit** unused amounts remaining in the contingency allowance to Owner by Change Order **include reasonable amount of overhead and profit for unused allowance portions.**

(5) Return unused materials purchased under the allowance to manufacturer or supplier for credit to owner. If requested, prepare unused material for attic stock storage by Owner when it is not economically practical to return the material for credit. Deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

C. UNIT PRICE ALLOWANCES

(1) Unit prices include all necessary material, cost for delivery, installation, insurance, overhead, profit, and applicable taxes.

(2) Unless otherwise indicated, Contractor's overhead and profit, labor, handling, installation, demolition, preparation, installation, access and other cost associated with the unit price shall be included in unit price allowances.

(3) Measurement and Payment: Where unit prices are for quantities that are more or less than what is provided for in the base contract, Contractor shall keep a record of amounts used as the work progresses. Such work shall be recorded daily on the as-built drawings or Owner approved log for verification. Contractor shall transmit unit quantity tracking information to Owner or Designer on a daily basis for verification. Designer or Owner shall verify the need for unit repairs prior to installation of repairs and track quantities. **No contract adjustments will be made on any unit price quantities not verified by the Designer or Owner. In the event that a discrepancy exist between the contractor's counted quantities and the designer's counted quantities, the designer's quantities shall prevail.**

(4) Adjustments to final payments will be the quantity difference between the allowance and quantity applied times the unit price quoted in the bid.

44. **USE OF PREMISES:**

The Contractor shall take every precaution against injuries to persons or damages to property.

The Contractor shall store its apparatus, materials, supplies, and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of its work or the work of any other contractors.

Unless otherwise provided, temporary storage sheds, shops, and office facilities may be erected on the premises with the approval of the Awarding Authority. Such temporary buildings and/or utilities shall remain the property of the Contractor and be removed at its expense upon completion of the Work, unless the Awarding Authority authorizes their abandonment without removal.
Necessary crossings of curbing, sidewalks, roadways and parkways shall be protected against damage, and any damage shall be repaired by or at the expense of the Contractor.

The Contractor shall not place upon the Work, or any part thereof, loads inconsistent with the safety of that portion of the Work.

The Contractor shall schedule work which will affect services or access to any building(s) or infrastructure on campus at a time convenient to the Awarding Authority and to minimize disruptions. The contractor shall perform any necessary work after regular working hours, at an accelerated rate, or on Sundays or legal holidays without extra compensation.

The Contractor shall provide and maintain such sanitary accommodations for the use of its employees and those of its Subcontractors as may be necessary to comply with the requirements and regulations of the local and State Department of Health and other regulatory agencies.

The Contractor shall be responsible for maintaining safe and unencumbered access and egress to and around the project site including all necessary temporary signage and pedestrian and vehicular protection.

45. **CUTTING AND PATCHING:**

The Contractor shall do all necessary cutting, fitting, and patching to properly receive the Work and to make its several parts join together as required by the Drawings and Specifications. After such cutting, Contractor shall replace or restore or repair all defective or patched work as required. Contractor shall not cut, excavate, or otherwise alter any work in a manner or by a method or methods that will endanger the Work, adjacent property, workers, the public, or the work of any other contractor.
The Contractor shall check the location of all sleeves, openings, slots, etc., for the piping, ducts, breeching, conduits, louvers, grilles, fans, etc., as they are laid out on the job.

Provision for openings, holes and clearances through walls, beams, floors, ceilings, and partitions shall be made and checked by the Contractor and/or its Subcontractor in advance for constructing such parts of the Work in order to avoid unnecessary, superfluous or dangerous cutting.

Unless otherwise specified, pipes passing through any parts of the Structure shall be provided with pipe sleeves two sizes larger that the pipe plus its insulation in order to provide independent movement.

Under no condition shall structural framing or other parts or members subjected to computed stress be cut or disturbed without the approval of the Designer. Any structural member which is cut must be restored by Contractor at its expense to its original strength by a method approved by the Designer.

In order to maintain design strengths, the Designer's approval shall also be obtained before cutting or drilling holes in concrete or masonry.

46. **PERIODIC AND FINAL CLEANUP:**

The Contractor shall periodically clean up, and remove from the premises, all refuse, rubbish, scrap materials and debris to the end that at all times the premises are sanitary, safe, reasonably clean, orderly, and workmanlike. Trash and combustible materials shall not be allowed to accumulate inside buildings or elsewhere on the premises. At no time shall any rubbish be thrown from an opening.

Should the Contractor fail to keep the premises in an orderly and workmanlike condition, the Awarding Authority may after 48 hours notice to the Contractor, and without prejudice to any other remedy it may have, correct such conditions and may deduct the actual cost thereof from payment then or thereafter due to the Contractor. If the premises are in a condition that poses an actual, or imminent potential, adverse effect on public health, safety or convenience, the Awarding Authority may reduce the required notice to four hours as provided in Article 25.

Before final completion and final acceptance the Contractor shall remove from the Awarding Authority's property, and from all public and private property, all tools, scaffolding, falsework, temporary structures and/or utilities including the foundations thereof (except such as the Awarding Authority permits in writing to remain); rubbish and waste materials; and all surplus materials, leaving the site clean and true to line and grade, and the Work in a safe and clean condition, ready for use and operation.
In addition to the above, the Contractor shall be responsible for the following special cleaning for all trades as the work shall have been completed:

A. cleaning of all painted, enameled, stained, or baked enamel work: Removal of all stains, fingerprints, and splatters from such surfaces.

B. cleaning of all glass: cleaning and removing of all stickers, labels, stains, and paint from all glass, and the washing and polishing of the interior and exterior of the same,

C. cleaning or polishing of all hardware;

D. cleaning all tile and floor finishes of all kinds: removal of all splatters, stains, paint, dirt and dust, and the washing and polishing of all floors as recommended by the manufacturer or as required by the Awarding Authority.

E. cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: removal of all stickers, rust stains, labels and temporary covers; cleaning and conditioning of all manufactured articles, material, fixtures, appliances and electrical, heating and air conditioning equipment as recommended or directed by the manufacturers, unless otherwise required by the Awarding Authority; blowing out or flushing out of all foreign matter form all dust pockets, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers or similar features; and freeing or cleaning identification plates on all equipment of excess paint and the polishing thereof.

47. **GUARANTEE OF THE WORK:**

Except as otherwise specified in the Modifications of the General Conditions or in the Supplemental General Conditions, all work, including those items purchased under the Purchasing Agent Agreement, shall be guaranteed by the Contractor against defects of materials, equipment, or workmanship for one year from the date of Substantial Completion of the Contract. If, within any guarantee period, repairs or changes which, in the opinion of the Awarding Authority, are required as the result of the use of such materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract Documents, the Contractor, promptly upon receipt of notice from the Awarding Authority, and without expense to the Awarding Authority, shall:

A. place in satisfactory condition in every particular all of such guaranteed work, correcting all defects therein; and

B. make good all damage to the building or site, or equipment or contents thereof, which is the result of the use of materials, equipment, or workmanship which are inferior, defective, or not in accordance with the terms of the Contract; and

C. make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.

D. provide, at Contractor's expense, a warranty bond for items not installed per the Contract Documents but left in place that may impair or reduce the reasonably expected service life of the building or related components or systems.

In any case wherein fulfilling the requirements of the Contract or of any guarantee embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, Contractor shall restore such disturbed work to a condition satisfactory to the Awarding Authority and guarantee such restored work to same extent as it was guaranteed under such other contract.

If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Awarding Authority may have the defects corrected and the Contractor and its Surety shall be liable for all expense incurred.

All special guarantees applicable to definite parts of the work that may be stipulated in the Contract Documents shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

48. **POSSESSION PRIOR TO COMPLETION:**

The Awarding Authority shall have the right use any completed or partially completed part of the Work. Such use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents. If, however, such prior use by the Awarding Authority delays the progress of the Work or causes additional expenses to the Contractor, an equitable adjustment in the contract price and/or time of completion will be made and the Contract will be modified in writing accordingly. Use pursuant to Article 37 by the Awarding Authority's contractor shall not constitute possession or the Work.

49. **LIQUIDATED DAMAGES:**

Time is of the essence of the Contract. Any delay in the completion of the Work as provided for in the Contract Documents will cause inconvenience to the public and will cause loss and damage to the Awarding Authority in additional interest and administrative, architectural, inspection and supervision charges. It is important that this Work be completed within the contract time limits.

Therefore, unless specified otherwise under SUPPLEMENTAL GENERAL CONDITIONS or MODIFICATIONS OF THE GENERAL CONDITIONS, or through any addenda to the contract documents, a time charge equal to nine percent (9%) interest per annum of the total contract price will be made against the Contractor for the entire period that any part of the Work remains uncompleted after the time specified for the completion of the Work as provided in the Contract Documents. The amount of the time charge shall be deducted from the final estimate and shall be retained out of monies otherwise due the Contractor in Final Payment, not as a penalty, but as liquidated damages sustained, it being mutually understood and agreed between the contracting parties that such amount is reasonable as liquidated damages.

50. **USE OF FOREIGN MATERIALS:**

In accordance with the provisions of Article 39-3-1, Code of Alabama (1975) the Contractor shall use only 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 and are not contrary to any sole source specification implemented under Article 39-2-2(f), Code of Alabama (1975).

In accordance with the provisions of Article 39-3-4, Code of Alabama (1975), the Contractor shall use only iron and steel produced in the United States or its territories when specifications in the Contract Documents require the use of steel. If, in the opinion of the Awarding Authority, the procurement of

such domestically produced iron and steel products is impractical as a result of a national emergency, national strike, or other causes, it may waive this restriction for building construction.

If domestic iron, steel or other domestic materials, supplies, or products are not used in accordance with this article, , the contract sum shall be reduced by an amount equal to any savings or benefits realized by the contractor.

51. **EQUAL OPPORTUNITY:**

The nondiscrimination clause contained in Article 202, Executive Order 11246, as amended by Executive Order 11375, relative to Equal Employment Opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.

52. **SIGN:**

Unless deleted under SUPPLEMENTAL GENERAL CONDITIONS, MODIFICATIONS OF THE GENERAL CONDITIONS, OR DIRECTED BY THE AWARDING AUHTORITY the Contractor will erect a sign at the project site identifying the project and indicating those entities participating in the development of the project. Information to be lettered on the 4' x 8' exterior grade plywood sign will be furnished to the Contractor by the Awarding Authority. The sign is to be maintained in good condition until completion of the project at which time the Contractor shall remove it from the site. Details of construction of the sign shall be as Attachment A.

53. **NO SMOKING POLICY:**

Smoking, including the use of electronic cigarettes or similar devices, is prohibited at all times and at all locations on The University of Alabama campus, including University-owned and leased facilities, properties, and grounds. This includes but is not limited to the following:

- The interior of all University-owned buildings;
- All outside property or grounds of the campus, including sidewalks, parking lots, parking decks, and recreational areas;
- All partially enclosed areas such as walkways, breezeways, patios, porches, gazebos, tents, and bus shelters;
- Within any University-owned vehicles, including buses, vans, shuttles, golf carts, and all other University vehicles;
- All indoor and outdoor athletics venues and facilities; and
- All other real property, buildings, and facilities under the primary control of the University.

The Contractor shall strictly enforce this policy with its employees, subcontractors, vendors, and any other personnel during the course of the Work.

54. **PARKING & TRANSPORTATION REQUIREMENTS:**

No permits will be provided for construction vehicle parking in University designated parking areas. Contractors shall not use visitor spaces or pay-to-park spaces. No permit required within construction fenced areas. Parking within construction fenced areas is to be directed and controlled by the Contractor and at the sole discretion of the contractor. The contractor shall provide a minimum of three (3) spaces for University personnel on site. As a convenience and at the University's sole discretion, The University shall provide designated offsite parking for workers and transportation to the project site as required by the project schedule, but not outside the hours of 6:30 AM to 8:00AM and 3:30 PM to 5:00 PM.

55. **CONSTRUCTION DEBRIS REPORTING:**

The Contractor will be responsible for tracking and reporting the construction debris (in tons) for the project. Construction debris consists of debris generated during the construction, renovation, and demolition of buildings or roads that is discarded in a permitted construction and materials landfill. Debris may include but not limited to: concrete, brick, stone, metals, glass, plastics, gypsum drywall, wood, and asphalt. Submission of this report will be required at project closeout. It is not our intention to obtain tonnage for dirt. A certified report will be turned in as a part of Closeout documents.

56. **COMMERCIAL USE OF IMAGES OF THE WORK:**

Contractor shall not use photographs, video, drawings or any other visual representation of the Work for the commercial promotion of the Contractor's business without the prior written permission of the Owner. This includes, but is not limited to, print and video advertisements, use at trade shows, submissions to professional organizations, and display on the Contractor's web site. This provision shall also be binding on any of the Contractor's subcontractors and Contractor shall require its subcontractors to agree to be bound by its terms.

57. **MINORITY & WOMEN OWNED BUSINESS:**

The Awarding Authority encourages the use of minority, women, and veteran-owned businesses ("MWB") in its construction program. Contract goals for MWB participation will be established in the prebid meeting agenda and incorporated into the bid documents by addendum. The apparent low bidder shall identify all MWB participation on the standard form provided in the bid documents and submit the completed form with the list of subcontractors. At the completion of the project the Contractor shall, if necessary, update this information to reflect the actual amounts paid to each MWB firm.

For a list of businesses in Tuscaloosa, go to https://www.tuscaloosa.com/tuscaloosabuilds/database

58. **SAFETY:**

The Contractor shall be responsible for all project safety. Neither the Consultant nor the Owner will be responsible for the Contractor's safety precautions, means, methods, techniques, sequences, or procedures.

Contractor's personnel responsible for safety shall be OSHA certified

Weekly employee safety meetings will be required with minutes of each meeting kept current. Contractor shall be responsible for coordination, content, scheduling, etc., of safety meetings with employees. Safety meeting minutes with sign-in sheets must be current for the contractor's pay request to be approved.

The General Contractor shall be responsible for maintaining a comprehensive Hot Work Program (i.e., welding, cutting materials that generate sparks, operations generating sufficient heat to ignite combustible materials, etc.) that meets the requirements of OSHA 29 CFR 1926.352, NFPA 51B or other industry standard. This program shall include reliable methods to issue hot work permits, provide a fire watch when needed and to have fire extinguishers at the hot work location in the event of a fire. The General Contractor must extend this requirement to all subcontractors.

Fencing along the limits of construction, including equipment and storage areas, is the Contractor's responsibility unless otherwise directed by the Owner. The cost of any type fencing, barricades, etc. necessary shall be incidental to project. Fencing, barricades, etc., must be maintained according to the project specifications throughout the duration of the project.

59. **MISCELLANEOUS:**

DRONES- Use of unmanned aircraft systems a/k/a "drones": Any use of unmanned aircraft systems ("UAS") during the course of the work shall be in strict accordance with the University's Policy on Use of Unmanned Aircraft Systems which can be found at http://policies.ua.edu. The General Contractor shall be responsible for ensuring all subcontractors, suppliers, and any employees thereof comply with the policy. In addition to the required permissions set out in the policy, the General Contractor shall also obtain approval from the UA Executive Director for Construction Administration (or designated representative) before the use of any UAS.

SOFTWARE- Document management is required through Owner's preferred software(s).

60. **LEGAL:**

INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, employees, and consultants (hereinafter collectively referred to as the "Indemnitees") from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of, related to, or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including loss of use resulting therefrom, and is caused in whole or in part by negligent acts or omissions of the Contractor, a

Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether such claim, damage, loss or expense is caused in part, or is alleged but not legally established to have been caused in whole or in part by the negligence or other fault of a party indemnified hereunder.

A. This indemnification shall extend to all claims, damages, losses and expenses for injury or damage to adjacent or neighboring property, or persons injured thereon, that arise out of, relate to, or result from performance of the Work.

B. This indemnification does not extend to the liability of the Architect, or the Architect's Consultants, agents, or employees, arising out of (1) the preparation or approval of maps, shop drawings, opinions, reports, surveys, field orders, Change Orders, drawings or specifications, or (2) the giving of or the failure to give directions or instructions, provided such giving or failure to give instructions is the primary cause of the injury or damage.

C. This indemnification does not apply to the extent of the sole negligence of the Indemnitees.

FORCE MAJUERE

If Contractor is delayed in the performance or progress of the Work by fire, flooding of the site, epidemic, abnormal weather conditions, act of God . . . or other causes not the fault of and beyond the control of the Authority and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times if proper notice is given and approved by Owner per article 19 Changes in Work.

CAPTIONS

The captions of document are for convenience and reference only, are not a part of this agreement, and in no way define, describe, extend, or limit the scope or intent of the General Conditions which follow.

PLAIN MEANING

The General Conditions shall be construed in its entirety according to its plain meaning and shall not be construed against the party who provided or drafted it.

SEVERABILITY

All of the terms, provisions, and conditions of this Agreement shall be deemed to be severable in nature. If for any reason the provisions hereof are held to be invalid, illegal, or unenforceable to any extent, then, to the extent that such provisions are valid and enforceable, a court of competent jurisdiction shall construe and interpret this Agreement to provide for maximum validity and enforceability of this Agreement.

END OF GENERAL CONDITIONS OF THE CONTRACT

SUPPLEMENTAL GENERAL CONDITIONS

PROJECT NAME
PROJECT NUMBER

1. OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
   1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
   2. Provide for delivery of Owner-furnished products to Project site.
   3. Upon delivery, inspect, with Contractor present, delivered items.
      a. If owner-furnished products are damaged, defective, or missing, arrange forreplacement.
      b. If, after inspection, Owner and Contractor agree the Owner-furnished materials are complete, free from damage or defect, and generally acceptable, ownership of and responsibility for the materials shall be transferred to the Contractor and shall remain with the Contractor until the project is substantially complete and turned over to the Owner. Any Owner-furnished material that is damaged, lost, stolen, or otherwise rendered unusable after acceptance but prior to substantial completion shall be replaced by the Contractor at no additional cost to the Owner.
   4. Obtain manufacturer's inspections, service, and warranties.
   5. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:
   1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
   2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
   3. Receive, unload, handle, store, protect, and install Owner-furnished products.
   4. Owner shall bear no responsibility regarding any of the above listed activities.
   5. Make building services connections for Owner-furnished products.
   6. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
   7. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished-Contractor-Installed (OFCI) Products:
   1. LIST OFCI Here

2. ANY OTHER PROJECT SPECIFIC GENERAL CONDITIONS

A.

END OF SUPPLEMENTAL GENERAL CONDITIONS

THE UNIVERSITY OF ALABAMA
CONTRACTOR INSURANCE REQUIREMENTS
Project: _____ – Version: _____

The University of Alabama ("University") is exposed to a financial risk from negligent/wrongful acts when using contractors and construction-related services involving new construction, renovation, remodeling, implosion or general maintenance of properties owned or controlled by the University. To reduce this potential financial exposure, the contractor and subcontractors of the above referenced construction project are required to maintain comprehensive insurance programs as shown below. Any modification to or waiver of the requirements must be submitted in writing to the Director of Contract Administration – Dan Rodgers, dorodgers@ua.edu, 205-348-2076, and approved in writing by the Director of Risk Management – Wade Bond, lwbond@ua.edu, 205-348-7516.

The required minimum limits of insurance do not limit any indemnification or hold harmless conditions that benefit the University.

All contractors and sub-contractors must provide written notice to the University of any claim against the University and any incident that could give rise to a claim against the University. Such notice should be provided to the University as soon as possible and in all cases no later than 7 days from the date of the claim or incident.

The contractor is responsible for insuring or replacing any property (including but not limited to equipment and supplies) owned, leased or rented by the contractor.

The purchase of insurance by the contractor shall in no event be construed as a fulfillment or discharge of the obligations set forth in the indemnification/hold harmless provisions of the agreement.

- **Commercial General Liability ("CGL")** without limiting endorsements on an occurrence bais to cover the contractor and its employees for all liability for bodily injury, property damage and personal injury with the following minimum limits:

Each Occurrence	$1,000,000
Products/Completed Operations Aggregate (Per Project)	$2,000,000
Personal & Advertising Injury	$1,000,000
General Aggregate (Per Project)	$2,000,000
Fire Damage	$ 100,000

The CGL must be provided on either Insurance Service Offices ("ISO") occurrence form CG 00 01 (current edition) or an industry equivalent and must include Contractual Liability covering all contractual agreements, both oral and written, including but not limited to, the hold harmless and indemnification agreements in any contract between the University and the contractor. The policy must include ISO endorsement CG 2010 1185 to include the University as an additional insured. Coverage must be maintained for a minimum of two years after completion of the project.

- **Contractor's Pollution Liability Coverage–** The general contractor is required to purchase this coverage before the start of the project and maintain this coverage for a minimum of three years after the project has been completed with the following minimum limits:

Third Party Liability	$2,000,000 per claim
Third Party Clean Up	$2,000,000 per claim

- **Professional Liability Coverage** with minimum limits of $1,000,000. Coverage must be maintained for a minimum of three years after the project is completed.

- **Commercial/Business Automobile Liability ("BA")** applicable to all automobiles owned, hired, rented or used by the contractor and automobiles not owned by but used on behalf of the contractor. The BA policy must be provided on either ISO form #CA 00 01 (current edition) or an industry equivalent. In the event the contractor's automobiles haul hazardous materials, the Contractor's policy must be amended to include Pollution Liability-Broadened Coverage (CA9948) or equivalent coverage. Coverage must be maintained for a minimum of two years after the project has been completed. Policy will provide the following minimum limits:

Combined Single Limit	$1,000,000

- **Excess/Umbrella Liability** with the following minimum limits:

Each Occurrence & Aggregate	$1,000,000

The CGL, BA and excess/umbrella limits outlined above may be accomplished through a combination of primary and excess/umbrella liability policies. In the event the primary CGL and/or BA limits are less than required, the amount of required excess/umbrella liability will increase by the amount the primary insurance is deficient. Excess coverage must be follow-form coverage. Coverage must be maintained for a minimum of two years after the project has been completed.

- **Workers' Compensation/Employer's Liability** insurance for the benefit of injured employees as required by law and Employers Liability with the following minimum limits:

Workers Compensation (Coverage Part A)	S*tatutory*
Employer's Liability (Cov Part B) - Per Occurrence and Per Employee	$1,000,000

Coverage must be maintained for a minimum of two years after the project has been completed. If applicable, the policy will be amended to provide coverage under the Longshoremen's and Harbor Worker's Compensation Act.

With the University's prior approval, a vendor/contractor may be allowed to participate in a workers' compensation self-insured (individual or group trust) program, and thus, waiving the *A.B. Best's* or *Standard & Poor's* rating requirement as long as self-insured is in good standing with the Alabama Department of Industrial Relations and evidence of excess insurance is provided.

- **Builder's Risk**

The general contractor is required to purchase builder's risk coverage. Coverage should be "all-risk" including, but not limited to, the following perils: fire, windstorm, hail, water damage,

flood, mold, earth movement (also known as "earthquake"), vehicle or equipment collision, paint overspray, collapse, vandalism and lightning. Coverage must be on a replacement cost basis. The carrier must be A- rated or better by AM Best and admitted in the State of Alabama. The coverage period must start on the first day of construction and must extend a minimum of 30 days after receipt of the Certificate of Substantial Completion. Property must be insured while in transit, while stored at an off-site location, while on the construction site but not yet attached to the building and after being attached to the building. The general contractor is responsible for absorbing the deductible in the event of a loss, and the deductible cannot exceed $10,000. The Board of Trustees of the University of Alabama must be included on the policy as both an additional named insured and a loss payee. An Evidence of Property Insurance certificate must be provided to Construction Administration showing both additional named insured and loss payee status, coverages and limits prior to the start of construction. Coverage limits must be as follows:

- Hard Costs: insured to full value
- Soft Costs: insured to full value
- Furniture and Fixtures: insured to the full value of items being purchased and/or installed by the contractor under the construction contract.
- Business Interruption: $100,000

Insurance Company Minimums - All policies will be underwritten by insurance companies acceptable to the University of Alabama. The insurance companies must have a minimum *A.M.Best's* rating of A-VII or higher.

Certificate of Insurance Requirements - Prior to the commencement of any work, the contractor must provide a Certificate of Insurance on the ACORD form or another form acceptable to the University evidencing coverage in compliance with the University's insurance requirements. The certificate of insurance will provide that the University of Alabama will be provided written notifications at least 30 days prior to any material change, cancellation or non-renewal of any policies indicated. All certificates shall be in original form and signed by a licensed Alabama agent.

The Certificate of Insurance shall include the following wording to extend additional insured status to the University and Hoar Program Management, L.L.C. and waiver of subrogation/rights of recovery provisions to the University:

> *The Board of Trustees of the University of Alabama, the University of Alabama, its individual trustees, officers, directors, employees, agents and representatives, the Architect/Engineer and Hoar Program Management, L.L.C. are included as additional insureds with respect to the Commercial General Liability, Business Auto Liability and Commercial Excess/Umbrella policies. Unless precluded by law or restricted or modified by contract, all policies waive the right to recovery or subrogation against the Board of Trustees of the University of Alabama, the University of Alabama, its individual trustees, officers, directors, employees, agents and representatives.*

A replacement certificate must be provided at least 10 days prior to the expiration of any policy. In the event the coverage is placed with a new insurance company upon expiration, coverage may not be altered or substituted unless the coverage terms are beneficial to *The Board of Trustees of the University of Alabama.*

Subcontractors - If the contactor elects to engage the services of a subcontractor or other related construction services, it is the obligation of the primary or general contractor to confirm every subcontractor and every lower tier subcontractor meets the insurance requirements outlined above. If for any reason a subcontractor fails to procure and maintain insurance as required, all such required

insurance shall be procured and maintained by the contractor at the contractor's expense in addition to the limits required of the contractor.

Although some subcontractors may be allowed an exemption to carry workers' compensation insurance due to size or structure of the entity, the obligation to provide insurance is not waived.

Exceptions to the requirments for subcontractors: Subcontractors are not required to purchase professional liability coverage or contractor's pollution liability coverage. For subcontractors, the required limit for excess/umbrella coverage is $1,000,000.

Deductibles and/or Self-Insured Retentions ("SIR") – A contractor may elect to secure an insurance program with a deductible or SIR of up to $25,000 without prior approval from the University. Any deductible or SIR larger than this amount must be approved by the University and audited financials will be required to judge the financial ability to absorb the obligations of a deductible or SIR without a material impact on the solvency of the contractor.

Waivers of Subrogation/Additional Insured Status

Unless precluded by law or restricted or modified by contract, all policies waive the right to recovery or subrogation against the Board of Trustees of the University of Alabama, the University of Alabama, its individual trustees, officers, directors, employees, agents and representatives. The policies shall provide such waivers of subrogation by endorsement or otherwise.

The Commercial General Liability, Business Auto Liability and Commercial Excess/Umbrella Liability policies shall name The Board of Trustees of the University of Alabama, the University of Alabama, its individual trustees, officers, directors, employees, agents, and representatives, HOAR Program Management, LLC, and the Architect/Engineer as additional insureds. The General Liability endorsement must be ISO CG 2010 1185. The contractor is responsible for any deductibles and/or self-insured retentions.

INVENTORY OF STORED MATERIALS

Project:

Contractor:

For Invoice No.: _____
For Period Ending: _____
UA Project No: _____

CAT	A DESCRIPTION	B MATERIALS STORED LAST PERIOD	C PURCHASED THIS PERIOD	D TOTAL COLUMNS B + C	E MATERIALS USED THIS PERIOD	F MATERIALS PRESENTLY STORED	G ONSITE OR OFFSITE
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
		$ -	$ -	$ -	$ -	$ -	
	TOTALS	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	

CHANGE ORDER

The University of Alabama **Construction Administration** **Box 870186** **Tuscaloosa, AL 35487-0186**	**Contractor Name:** **Address:**
Change Order No.:	**Project Name:**
Date:	
	Project Number:

Executed summary page of each CORAF below is included in this DocuSign change order. Entire CORAF can be accessed for review using hyperlinks below. CORAF Link will be active during routing of change order. CORAF No. will become active hyperlink after change order is executed.

CORAF Link	CORAF No.	Description of CORAF (Brief)	Approved Value
		Total	**$0.00**

ADJUSTMENTS TO CONTRACT PRICE

Original Contract Price		
Net Total of Previous C.O.s (Includes Alternates Awarded After Contract)		**$0.00**
Previous Revised Contract Price		**$0.00**
This Change Order	**(Add) or (Deduct) or (No Change)**	**$0.00**
Revised Contract Price (Including Award of Bid Alternates)		**$0.00**
Total Alternates Awarded After Contract Included in Revised Contract Price Above		**$0.00**

Extension of Time for this Change Order: **Zero (-0-) Calendar Days**

The Contract Completion Date <u>after</u> this Change Order is executed is:

CHANGE ORDER

The University of Alabama **Construction Administration** **Box 870186** **Tuscaloosa, AL 35487-0186**	**Contractor Name:** **Address:**
Change Order No.: **Date:**	**Project Name:** **Project Number:**

The amount of this Change Order is the responsibility of: The Board of Trustees of the University of Alabama, a corporation. The Owner and the Contractor hereby agree to the terms of this Change Order as contained herein. The Owner does hereby certify that this contract was let in accordance with the provisions of Title 39 Code of Alabama as amended. The change in contract price and/or completion date of the Work described above, is considered to be fair and reasonable. This change has been mutually agreed upon in full and final settlement of all claims for delays and disruptions as well as for any fundamental alterations of the scope of the Work resulting from, caused by, or incident to this modification or change order.

Consent of Surety

**only required if total changes exceed 10% of revised base contract*

by: _____

Recommended

by: _____
Architect of Record

by: _____
Project Manager

by: _____
AVP Construction Administration

by:_____
Director of Contract Administration

Contracting Parties

by:_____
(Contractor)

The Board of Trustees of
The University of Alabama, a corporation

by:_____
Cheryl Mowdy, Interim Vice President for Finance and Operations

Subcontractor Change Proposal / Cost Breakdown Form

Date: _____ **Architect Name:** _____

Contractor Name: _____ **Subcontractor Name:** _____

Project Name: _____ (Check One)

U of A Job Number : _____ **Initiated By:** Owner/Architect ☐

GC Job Number: _____ GC ☐

Reference Change Proposal Request Number: _____ Subcontractor ☐

Brief Description of Proposed Change: _____

Item/Description	Quantity	Unit	Unit Cost	Amount		
				Material	**Labor**	**Equipment**
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
				$0.00	$0.00	$0.00
			Sub Totals:	$0.00	$0.00	$0.00

Material: $0.00

Labor: $0.00

Burden: #VALUE! ___% Labor only (per Article 19.B.1.c.vi. of the General Conditions)

Equipment: $0.00

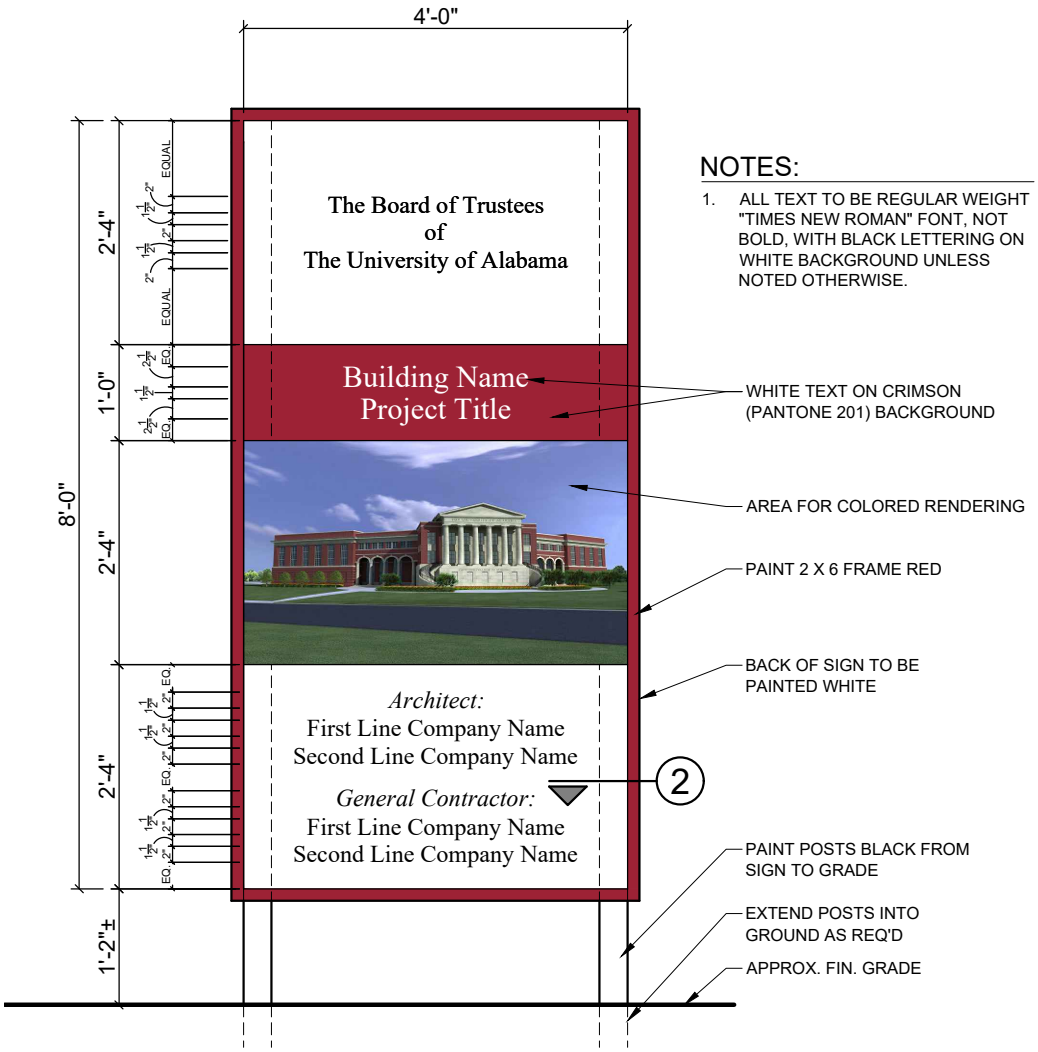
Subtotal: #VALUE! (Direct Cost)

Overhead & Profit: #VALUE! _____% Of the Direct Cost & Per the Limits in Article 19.B. of the General Condit

Sales/Use Tax: $0.00 9% Material only

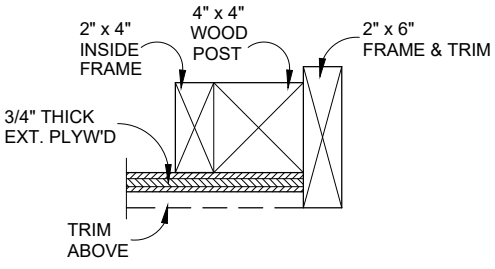
Total Cost Change **#VALUE!** ◉ Add ○ Deduct

Rev. 9/11



1 ELEVATION

NO SCALE



2 SECTION

NO SCALE

THE UNIVERSITY OF ALABAMA®
Division of
Finance and Operations
Construction Administration
413 Cahaba Circle
Tuscaloosa, Alabama 35404
Phone: (205) 348-5950
Web: constructionadministration.ua.edu

CONSTRUCTION ADMINISTRATION: DESIGN GUIDELINES

Drawing Title:

NON-STATE FUNDED PROJECT SIGN WITH RENDERING

Revised Date: 03/07/2023

Scale: NO SCALE

Drawing Number: PS1

The University of Alabama
Underground Utilities Locate

Purpose

In order to protect underground utilities from damage and to avoid service outages, The University of Alabama ("UA") has established these Procedures to define responsibilities and outline the steps in locating underground utilities before excavating the ground and demolishing a building or structure. These Procedures also apply to locating underground utilities before operating, parking, storing, locating, or placing heavy equipment, vehicles, cranes, storage containers, or other objects on the ground's surface above underground utilities to prevent the weight of the equipment and/or object from damaging, rupturing, or severing the underground utilities and related infrastructure.

This is in coordination with all other requirements per contract documents.

Procedures

1. The Primary Party executing the work (i.e. Contractor, UA Facilities Administration Shop Manager ["UAFA"] or UA's Project Manager/Supervisor, etc.) shall complete the upper section of the Pre-Excavation Notification & Sign-off Sheet. The UA Utility Locate Coordinator shall be responsible for facilitating completion of the balance of the Sign-off Sheet. No excavation shall commence without a completed sign-off sheet. The Primary Party should allow a minimum of 2 full working days, not including the day of request, for the locate to be completed. For the purposes of these Procedures, the 2 full working days will only consist of Monday to Friday, excluding the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and the Friday following Thanksgiving Day, Christmas Eve and Christmas Day. If any of these holidays occur on a Saturday, it will be observed on the preceding Friday and if any of these holidays occur on a Sunday, it will be observed on the following Monday. Thus, as an example, if the Contractor or UAFA plans to commence an excavation on the Monday following Thanksgiving Day, the line locate request must be initiated no later than the Monday preceding Thanksgiving Day.

   Effective January 1, 2020, the law states that Alabama One-Call (811) excavation periods are valid for 20 working days. UA locate request will maintain a valid 10 working day excavation period and not acknowledge Alabama One-Call's (811) 20 working day valid excavation period. The valid 10 working day excavation period for UA locates will begin after 2 full working days from the day the request is submitted, regardless if the sign-off sheet is completed or not. Thus, as an example, if the UA locate request is submitted on Monday, then the valid 10 working day excavation period will begin on Thursday if none of the above holidays are observed during this time period. Any valid 10 working day excavation period that includes the above noted holidays will be extended the same amount of duration as the respective observed holiday. No excavation shall commence prior to the Sign-Off Sheet being completed and a copy provided to the Primary Party regardless of how long it takes all UAFA representatives to perform the locate.

2. The Primary Party is responsible for calling Alabama One-Call and emailing the UA Utility Locate Coordinator to request an underground locate of the respective underground utilities. In an attempt to sync the start, refresh and expiration dates of the Alabama One-Call (811) locate with the UA Utilities Locate, the primary party must request the Alabama One-Call (811) locates the same day as emailing the UA Utility Locate Coordinator.

3. The Primary Party shall complete the upper section of the Sign-off Sheet, including the required confirmation numbers from Alabama One-Call and forward to the UA Utility Locate Coordinator (linelocate@ua.edu) along with a Google Map image (satellite view) clearly defining the extent of the area of work highlighted in red for the requested locate. The intent is to avoid potential locating delays due to locating nonessential or unneeded areas.

4. As the underground utility locate is completed, the respective UAFA representative who performed the underground utility locate shall sign and date the applicable blank on the Sign-Off Sheet or provide an e-mail confirmation to the UA Utility Locate Coordinator referencing the UA Work Order #. If necessary, the person performing a utility locate shall provide comments of any special concerns, requirements to deviate from routine practices, or other precautions that the Primary Party, the Contractor, UAFA, the UA Utility Locate Coordinator, person who is performing the excavation or equipment parking must follow.

5. Once the Sign-Off Sheet is completed, a copy shall be placed in the project file and a copy provided to the Primary Party, Project Manager/Supervisor/Field Coordinator and other parties listed on the sign-off sheet.

6. The Primary Party may elect to request a utility locate for the purpose of project/work planning and this preliminary locate may determine the lack of underground utilities in the area where the work is planned. This preliminary locate does not relieve the Primary Party from the need to follow the procedures prior to commencing work unless the preliminary locate clearly revealed there are no underground utilities exposed to potential damage in the work zone.

Underground Utility Markings

1. Locate marking lines for underground utility lines are approximate. The Primary Party shall not excavate or park equipment within the defined UA tolerance zone prior to potholing (hand digging or use of other non-destructive methods) in order to physically locate the underground utility. Potholing shall be performed on all underground utilities, whether UA owned or non-UA owned, within the defined UA tolerance zone unless, a wider tolerance zone is required. The UA tolerance zone is defined as a minimum of 36" (3 feet) from the outside edges on either side of the locate marking.

2. In some situations where the underground utility locating device is not indicating a precise location of the underground utility, as an additional precaution the locate marking line will be altered from a single line to a dual line with "dot or X" in the center to indicate a wider area under which the underground utilities may be located. This dual-line locate marking does not relieve the Primary Party from the obligation to hand dig or use other non-destructive methods as may be appropriate under the circumstances to protect the underground utilities.

3. The common color coding shall follow the American Public Works Association (APWA) Uniform Color Code to mark underground utilities to include:

WHITE		Proposed Excavation
PINK		Temporary Survey Markings
RED		Electric Power Lines, Cables, Conduit, Lighting Cables
YELLOW		Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE		Communication, Alarm or Signal Lines, Cables or Conduit
BLUE		Potable Water
PURPLE		Reclaimed Water, Irrigation, Slurry Lines, Thermal Energy
GREEN		Sewer and Drain Lines

Primary Party Responsibilities

1. In order to protect the underground utilities, the Primary Party is responsible for visiting the site of the planned excavation and/or equipment placement to become familiar with the site and to evaluate the accuracy of the locate marking lines before beginning any excavation work or placing equipment in the area.

2. The Primary Party must obtain a copy of the fully completed and signed Sign-Off Sheet prior to beginning any excavation work and/or placing equipment in the area. The Primary Party must also sign and date the bottom of the Sign-off Sheet and return a copy to the UA Field Coordinator.

3. The Primary Party shall pothole (hand dig or use other non-destructive methods such as a water-jet) to expose the exact location and depth of the underground utility prior to excavating by mechanical means and/or placing equipment in the area. Once the utility is exposed by potholing, the Primary Party is to request to have the utility surveyed by the UA Surveyor. Then, a measurement is to be taken from ground level to the top of the utility. This depth along with the identity of the utility is to be marked with permanent marker on a survey stake and the stake placed within 18 inches of the pothole location. (This does not relieve the contractor from producing "as-builts")

4. As underground utility locate marking lines are removed by scraping, excavation, weather, etc., the Primary Party must either know where the locate marking lines had been placed and/or must request new locate marking lines be put in place by calling the UA Utility Locate Coordinator. Primary Party shall make reasonable efforts to maintain markings during the valid 10 working day period for which the excavation permit is current. If needed, the Primary Party may call for a refresh of the location should previous markings be obscured.

5. The Primary Party must promptly notify UA's Project Manager/Supervisor and UA Utility Locate Coordinator of any proposed changes in the excavation work or equipment placement location that differs from the planned location for those activities at the time the Sign-off Sheet was completed in order to determine if additional underground utility locate services are necessary or desirable.

6. **The Primary Party is responsible for reviewing all contract documents prior to the excavation and to advise of any discrepancy between the documents and the markings.** If at any time the Primary Party has concerns with the underground utility locate marking lines, the

Primary Party shall work with UA's Project Manager/Field Coordinator and UA Utility Locate Coordinator to address the Primary Party's concerns and determine if additional underground utility location marking work is necessary or desirable to ascertain the location of the underground utilities.

7. The Primary Party shall be solely and completely responsible for taking such steps and precautions as may be necessary to protect the underground utilities from damage, destruction, or severance and for the safety of all persons and property. The Primary Party shall supervise and execute the excavation or equipment placement to facilitate and promote its safe execution and performance.

8. The Primary Party shall be responsible for the prompt remedy of damage and loss to underground utilities and related infrastructure and to pavement, pavement markings, turf, mulch, trees, shrubs, curbs, sidewalks, roads, and irrigation systems caused in whole or in part by the Primary Party, a subcontractor, or anyone for whose acts the Primary Party may be liable.

9. The Primary Party shall adequately provide protection to all surface and subsurface utilities including, but not limited to, existing valves, valve coverings, manholes, electrical equipment and other utility components within the Project site and adjacent property where work is being performed in relation to the Project. Protection should include, but is not limited to, locating, marking/flagging, barricading or other means necessary to avoid damage to all utility components. In the event where a utility component is damaged due to negligence by the Primary Party, the Primary Party shall immediately notify the UA Project Manager and diligently cooperate with the Awarding Authority until repairs are complete. All repairs and replacements shall be performed only upon approval of Awarding Authority whose decision shall be final.

Responsibility for Damage

1. The underground utilities locate process is a service provided by UA for the purpose of promoting and enhancing the protection of existing underground utility systems and worker safety. Nothing in these Procedures shall relieve the Primary Party performing the work from liability for any and all expenses and costs associated with or arising from the uncovering and recovering, repair, restoration, or replacement of underground utilities and related infrastructure damaged, destroyed and/or severed by the Primary Party. Primary Party also shall remain fully liable for all costs and expenses necessary to repair, replace or restore damaged or destroyed pavement, pavement markings, turf, mulch, trees, shrubs, curbs, sidewalks, roads, and irrigation systems to original condition and to UA's satisfaction unless otherwise described in the contract documents for the Project.

2. In addition to the obligation to repair the damaged underground utilities, the Primary Party shall remain obligated to reimburse the University for any loss of revenue due to an underground utility outage caused by the Primary Party and for all other expenses and costs incurred by UA as a result thereof.

3. Nothing in these procedures shall be deemed to alter or amend in any manner the Project Contract Documents. In the event of any conflict between these Procedures and the Project's Contract Documents, the provisions of the Contract Documents shall prevail and take precedence of the provisions of these Procedures.

4. In the event timely notice of such excavation of digging is not given or if such notice is given but a utility, telephone cable or network fiber is cut or damaged due to the negligence of the Primary Party, the University will charge the Primary Party the following amounts and may withhold from any accrued payments the amounts due.

For Telecommunication Lines:

Fiber:
$ 5000 Service Interruption Fee
$100 per fiber splice (i.e. the fiber is 30 pair, then 60 splices will be required)
Plus cost of Material

Copper:
$5000 Service Interruption Fee
Time – Rate is $35.00/manhour and $50.00/Overtime manhour
Plus Cost of Material

+

For All Other Utilities:

Time and Material for cost of the repair to the utility, any loss of business or operational use, any UA necessary support of the event, and any quantifiable utility cost.

The minimum charge for the first event will be the greater of the actual time and material cost as described above or $2,500. The minimum charge for each subsequent event will be the greater of the time and material cost or $5,000.

Definitions

"**Primary Party"** means any persons executing the work (i.e. Contractor, UA Facilities Administration Shop Manager ["UAFA"] or UA's Project Manager/Supervisor, etc.

"**Excavating**" or "**Excavation**" means digging, drilling, penetrating, or any other operations that disturbs the ground's surface under which underground utilities might be located.

"**Equipment Parking**" or "**Equipment Placement**" means operating, parking, storing, locating, or placing heavy equipment, vehicles, cranes, storage containers, or other heavy equipment or objects on the ground's surface under which underground utilities might be located.

"Shop Manager" means the most senior person in UAFA responsible for the work of the Department's skilled workforce (e.g. plumbing, HVAC, electrical, grounds, etc.)

"**Sign-off Sheet**" means the Pre-Excavation Notification & Sign-off Sheet.

"**Underground Utilities**" means underground electrical, natural gas, steam, domestic water, sanitary sewer, chilled water, irrigation, heated water, storm drainage, telephone, cable, alarm, fiber optics, or any other utility or service whether owned by UA or by public service and utility providers.

"**Working Day**" means Monday to Friday, excluding the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day and the Friday following Thanksgiving Day, Christmas Eve and Christmas Day. If any of these holidays occur on a Saturday, it will be observed on the preceding Friday and if any of these holidays occur on a Sunday, it will be observed on the following Monday.

End of Document

Crane Work Permit

Note: This permit must be completed and signed before work can proceed.

Date: Time: (from) (to)

Lift Data

Description (work area, work to be performed, load, etc.)

(1) **Load Weight**:
_____lbs.

(2) **Total Rigging Weight** (main hoist, auxiliary boom, headache ball, slings, shackles, hardware):
_____lbs.

(3) **Total Lift Weight**:_____lbs.

(4) **Lifting Height**:
(a) Height of Load to be not greater that _____ft.
(b) Maximum Height of Crane Boom / Extension Tip _____ft.
(c) Did crane owner contact FAA to verify if maximum height of Crane Boom tip is within local FAA/Airport limits per – Obstruction Evaluation/ Airport Airspace Analysis (OE/AAA) federal regulations ; Title 14, Part 77 which establishes standards and notification requirements for objects affecting navigable airspace? *(yes or no)*
_____

(5) **Operating Radius**: Maximum swing radius of load _____ft.

(6) **Counterweight**:
(a) Total Weight_____lbs.
(b) Total Crane Weight_____lbs.
(c) Did Crane Operator verify that counterweight is sufficient? *(yes or no)* _____

Building Evacuation

(1) Will the building be occupied? *(yes or no)* _____
(2) If yes, are building evacuation signage to exits and paths of egress? *(yes or no)* _____

Crane Data

(1) Crane manufacturer:_____
(2) Model number: _____
(3) Date of last annual inspection: _____
(4) Inspected by:_____
(5) Verify manufacturers load chart indicate lifting capacity at stipulated load radius and boom heights. *(yes or no)* _____

Outriggers, Pads, and Tires

(1) Has an engineering review determined underground utilities and structures are not at risk? (yes or no) _____
(2) Is the pavement at risk from the total outrigger bearing pressure? *(yes or no)* ___
(3) Will outrigger mats sized to reduce outrigger bearing pressure*? (yes or no)* _____
  (a) *Verification of soil bearing pressure aligned with outrigger mats? (yes or no)* _____
(4) Are outriggers fully extended and set? *(yes or no)* _____

Campus Notification

(1) Has Campus Police been notified of the crane work? *(yes or no)* _____
(2) Is a road closure required? *(yes or no)* _____
(3) Are detour signs posted, if necessary? (yes or no) _____
(4) Is the swing radius area secure and taped off? (yes or no) _
(5) UA and Alabama One-Call (811) utility locates complete? (yes or no) _____

Crane Operator Licensing

(1) Did the Crane Operator provide a current Crane Operators License issued by the Alabama Department of Labor and Workforce Development? (this does not apply to cranes with manufacturers' rated capacity of less than 10 tons) *(yes or no)* _____
(2) Did the Crane Operator provide evidence of certification by the National Commission for the Certification of Crane Operators, or any other crane operator certification program found by the Crane Operators Advisory Board to offer an equivalent testing and certification program?*(yes or no)* _____
(3) Did the Crane Operator provide evidence of a current medical certificate? *(yes or no)* _____

Overhead Electrical Distribution and Transmission Lines

(1) Are there overhead electrical lines? *(yes or no)* _____
(2) If yes, is there a standby person to assure that the operator maintains a safe working clearance from energized electrical lines in accordance with OSHA regulations? *(yes or no)* _____

- No FAA flags are allowed on campus, only FAA approved lighting.
- No flags or advertising material may be hung from crane without prior written approval.

General Contractor Superintendent:	Phone/email:

Crane Operator:	Phone/email:

UA Field Coordinator:	Phone/email:

Site Prep Approval Sign-Off Sheet

(Must be completed prior to starting actual construction)

UA Project:_____ UA Project/Account No.: _____
UA PM:_____ Phone/Email: _____
UA FC:_____ Phone/Email: _____
Project Start Date: _____

Contractor Contacts:

Contractor:_____
Project Manager:_____ Phone/Email: _____
Project Superintendent:_____ Phone/Email: _____
Other:_____ Phone/Email: _____

Pre-Excavation Notification Complete:_____ Date:_____
Fencing and Screening Installed:_____ Date:_____
Erosion Controls Installed: _____ Date:_____
Site Entrance Installed per plans:_____ Date:_____
Tire Wash Rack Installed: _____ Date:_____
Valve Protections Installed: _____ Date:_____
Required Signage Posted: _____ Date:_____
Tree Protections Installed: _____ Date:_____
Traffic Plan as Required: _____ Date:_____
Other Requirements: _____ Date: _____

In Case of Emergency

For ALL Emergencies, Please Call UA Police Department (205) 348-5454	
UA Construction Admin. Rep. Alison Hewson (205) 348-1684 / ahewson@ua.edu If unable to reach Construction Admin. Rep., please see contacts below.	
UA Telecommunications (205) 348-9555	UA Plumbing (205) 348-8710
UA Electrical (205) 348-3961	UA Grounds/Irrigation (205)348-2657

Comments: _____

By signature below, the UA Field Coordinator and the Contractor Superintendent have walked the project site and confirmed that all required site safety and protection measures are in place and are installed properly. Work on the project may now proceed. This Form must be submitted to the UA Project Manager.

General Contractor Superintendent: _____ Date:_____

UA Field Coordinator:_____ Date:_____

THE UNIVERSITY OF ALABAMA

Construction Administration

Sub-Grade/Base/Asphalt Check List

Project Name: _____ Project Number: _____

The checklist below has been developed with the intent to insure that when a project has been completed there is not any water holding/ponding within the roadway or parking areas including but not limited to curb and gutter, valley gutters, handicap ramps, etc. We *WILL NOT ACCEPT ANY PATCHES IN A NEW PAVED AREA*; therefore, The University will not accept a newly paved road or parking lot that has been patched or looks like it has been patched. The result of a patched area will require the entire street or parking lot to be totally milled out from cold joint to cold joint and replaced back at the contractor's expense.

Sub-Grade **Circle Answer**

- Has subgrade been compacted around all inlets and structures within the roadway or parking lot? YES/NO
- Has Geotechnical Consultant taken all required test and proof rolled area? YES/NO
- Did any areas have to be retested/rechecked for any areas that has failed or moving? YES/NO If yes then has contractor been back charged for retesting? YES/NO
- Have the grades been check/verified by the contractor or the civil engineer? YES/NO
- Has subgrade been checked around the edges of the curbs/sidewalks for loose material and to ensure the proper paving build up will be installed? YES/NO
- Has sub-grade been properly graded smooth between grades? YES/NO

Field Coordinator: _____ **DATE:** _____

Project Superintendent: _____ **DATE:** _____

R**ichard Powell:** _____ **DATE:** _____

Base Grade

- Prior to the contractor beginning the installation of the stone base did you make check the stone base to make sure they were installing LIMESTONE BASE? YES/NO
- What build up , in inches, is required? _____
- If the sone base buildup is greater than 6" it will need to be installed in two equal lifts with density test run on each lift. Was this verified? YES/NO How many lifts were installed? _____ What was the thickness of each lift (in inches)? _____
- Has the contractor compacted to the required specifications around all curbs, inlets and structures within the road or parking area? YES/NO
- Has Geotechnical Consultant taken all required test on base, whether it's one lift or both lifts? YES/NO
- Did any areas have to be retested/rechecked for any areas that has failed or moving? YES/NO If yes then has contractor been back charged for retesting? YES/NO
- Have the grades been check/verified by the contractor and the civil engineer including the grades of any curb/curb and gutter to verify positive drainage? YES/NO
- Has the base been checked around the edges of the curbs/sidewalks for loose material and that the proper build up will be installed? YES/NO
- Have you potholed the base to ensure the proper build up? YES/NO
- Has the base been properly graded smooth between grades? YES/NO

Field Coordinator: _____ DATE: _____

Project Superintendent: _____ DATE: _____

R**ichard Powell: _____ DATE: _____**

Asphalt Binder

- Did Geotechnical Consultant run density test no longer than 24 hrs. before prime coat has been placed? This is to ensure compaction and moister requirements are still good. YES/NO
- What is the required asphalt build up? _____
- If your build up is 5.5", that should be 220lb (2") of lower binder and 220lb (2") of upper binder. The wearing layer thickness is 165lb (1.5"). Each of these layers will need to be applied in three different lifts (the wearing layer will be the last thing you do after ALL THE CLEAN UP HAS BEEN COMPLETED).
- Has Geotechnical Consultant been notified for the paving? YES/NO
- Have you had the contractor cover all the valves and manhole lids that are within the paving area with a heavy mill plastic? YES/NO This will help the contractor during clean up.
- Once the first layer has been installed and before the second can go down all dust, debris etc. needs to be cleaned from paved area before tack coat has been applied. YES/NO
- After the second layer has been laid check for high and low areas around the curbs and out in the paved area. If the surface is rough the paving contractor may need to mill and plane this area to create a smooth service before the wearing layer is installed. Also, if there is a place that is in question of holding water, please flood test. Have you checked for smoothness of the road or parking lot and possible areas that may hold water? YES/NO

Field Coordinator: _____ DATE: _____

Project Superintendent: _____ DATE: _____

R**ichard Powell: _____ DATE: _____**

Wearing Surface

- Has the road been cleaned of all debris and dust before tack coat? YES/NO
- Has Geotechnical Consultant been notified? YES/NO
- While paving is being installed you should check your drainage points to the inlets for highs and lows. ***Its critical to catch while asphalt is still hot enough to fix.***
- The contractor MUST FLOOD TEST THE PAVING AT THE END OF EACH DAY OR DURING THE PAVING OPERATION. This will help catch areas that are not draining correctly so that its fixed while the asphalts hot.

Field Coordinator: _____ DATE: _____

Project Superintendent: _____ DATE: _____

R**ichard Powell: _____ DATE: _____**

Permitting, Inspection & Certificate of Occupancy Procedure for University of Alabama Projects

All questions regarding this procedure shall be directed to the University of Alabama Inspection Coordinator (UA IC), Alison Hewson (205) 348-1684. All correspondence regarding this procedure shall be copied to the UA IC at ahewson@ua.edu

Land Development Permitting

Applicability –
On all construction projects (including building additions, infrastructure and hardscaping projects) involving land disturbance, outside utilities or groundwork, a Land Development Permit (LDP) must be obtained from the City of Tuscaloosa.

Renovations, repairs, alterations and remodeling projects which do not involve land disturbance, outside utilities or groundwork, a LDP is not required.

Civil Engineer of Record (CEOR) –
The Civil Engineer of Record (CEOR) will apply for a Land Development Permit (LDP) through the Office of City Engineering (OCE). The CEOR will obtain a Land Development Permit application online at www.tuscaloosa.com – Departments – City Engineer, or by requesting an LDP application by email at ocemail@tuscaloosa.com. The CEOR will submit the LDP application and a set of 100%, stamped site drawings including all disciplines to the OCE electronically at ocemail@tuscaloosa.com for review. The subject line of the email shall read: "UA Project Name – UA Project # - LDP Review" and include the street address if available. There are no fees associated with obtaining a LDP, except on projects that involve sanitary sewer piping. The CEOR will provide the OCE with a linear footage of sanitary sewer piping that is 6" or greater in diameter, if applicable, which will be used by the OCE to establish the fee amount to be paid by the contractor once the project bids.

The OCE will review the drawings and communicate all comments back to the CEOR by email. The CEOR will then address all the comments made by the OCE. Revisions shall be annotated on the drawings with revision number and date, and then the CEOR will electronically re-submit the corrected drawings to the OCE by email. The subject line of the email shall read: "UA Project Name – UA Project # - Revised LDP Review" and include the street address if available. Once the drawings are approved, the OCE will send the LDP to the CEOR by email. The CEOR will transmit the LDP to the UA Project Manager (UA PM) to be signed by Cheryl Mowdy, AVP for Finance & Operations. Once the LDP has been signed by Cheryl Mowdy and returned to the UA PM, the UA PM will transmit the LDP to the CEOR to be submitted electronically to the OCE. The OCE will stamp the LDP as well as the 100% drawing set cover page and send both electronically, directly to the CEOR. The CEOR shall then hand deliver the following to the OCE: (4) hard copies of the approved and stamped 100% site drawings including all disciplines for projects that DO NOT include sanitary sewer piping or (5) hard copies of the approved and stamped 100% site drawings including all disciplines for projects that DO include sanitary sewer piping.

The OCE will provide Planning and Development Services (PDS) with acknowledgment of the issued LDP for future building permit record purposes.

Site Contractor –
Once the project bids, the Site Contractor shall visit the Office of City Engineering (OCE) located at City Hall to pay the fee associated with the sanitary sewer piping linear footage previously provided to the OCE by the CEOR. This fee is calculated at $ .25/Linear foot with a minimum of $100.00 on all projects that include sanitary sewer piping that is 6" or greater in diameter.

Suitable methods of payment include: a check (made payable to the City of Tuscaloosa), or cash. If the project does not include sanitary sewer piping that is 6" or greater in diameter there will be no associated fee and the contractor will not need to visit the OCE.

*During construction, any significant civil changes must be submitted by the CEOR to the OCE following the same procedure outlined above. If the linear footage of sanitary sewer piping 6" or greater in diameter changes, an additional cost/refund may apply depending on an increase/decrease of linear footage, respectively.

Building Permitting

Applicability –
On all UA construction projects that require a formal bid, a Building Permit must be obtained from the City of Tuscaloosa unless the project scope is defined as only the following: Interior Finishes (paint, carpet), Exterior Envelope (roof and window replacement), Exterior Work (landscape, hardscape, utilities, infrastructure, light poles) or General Maintenance (repair or replacement of equipment). Purchase Order (PO) projects will not require a Building Permit unless the project involves replacement, addition and/or relocation of any life safety component(s), and/or removal/addition of walls or doors that ultimately affect the path of egress.

UA Construction Administration (UA CA) –
UA Construction Administration (UA CA) shall keep the latest copy of all 3rd Party Inspectors resume's on file and submit them to Planning and Development Services (PDS). UA CA shall be responsible for informing PDS of any changes regarding the 3rd Party Inspectors.

Architect of Record (AOR) –
60% - In conjunction with the standard uploads for UA design submittal milestones on the UA SharePoint project site, the AOR shall provide the City of Tuscaloosa Fire and Rescue Service (TFRS) with a SharePoint web link where the 60% PDF full set of drawings can be downloaded. The SharePoint web link shall be sent by email to tfplansreview@tuscaloosa.com with attention to Fire Marshal Patrick Stines. The subject line of the email shall read: "UA Project Name – UA Project # - 60% Review". The TFRS will review the drawings and communicate all comments back to the AOR by replying to the original email. The AOR shall acknowledge that they received comments from the TFRS and incorporate those comments into subsequent design submittals.

90% - In conjunction with the standard uploads for UA design submittal milestones on the UA SharePoint project site, the AOR shall provide the City of Tuscaloosa Water and Sewer

Dept. – Linear Assets Division with the following documents for all new construction or renovation projects that involve the installation of a new grease trap, modification of an existing grease trap and/or change in commercial kitchen waste output:

- Civil Site/Utility Plan
- Floor plans of commercial dining areas showing seating capacity
- Floor plans of commercial kitchen areas showing cooking lineups
- Plans showing locations, capacities and installation details for grease traps

These documents shall be in PDF format and sent by email to greasetrapreviews@tuscaloosa.com. The subject line of the email shall read: "UA Project Name – UA Project # - Grease Trap Review". The City of Tuscaloosa Water and Sewer Dept. – Linear Assets Division will review the documents and communicate all comments back to the AOR by replying to the original email. The AOR shall acknowledge that they received comments from the City of Tuscaloosa Water and Sewer Dept. – Linear Assets Division and incorporate those comments into subsequent design submittals. See the City of Tuscaloosa website http://www.tuscaloosa.com/Government/Departments/Water/fats-oils-grease for details and updated information.

Following the Alabama Department of Finance - Division of Construction Management (DCM) Final Plan Submittal Review, the AOR shall address and correct all DCM comments. The AOR shall then provide the TFRS with a SharePoint web link where the corrected drawings along with their responses to the DCM's comments can be downloaded. The SharePoint web link shall be sent by email to tfplansreview@tuscaloosa.com with attention to Fire Marshal Patrick Stines. The subject line of the email shall read: "Conformance Documents with DCM Comments – UA Project Name".

General Contractor (GC) –
The GC shall apply for a Building Permit through Planning and Development Services (PDS). There are no fees associated with obtaining a Building Permit. The GC must first obtain a permit application and a revenue form by visiting PDS located at City Hall. The Revenue Form will be filled out and submitted at a later date as detailed in the Certificate of Occupancy section.

The GC will hand deliver the following to PDS in order to obtain the Building Permit:

- (1) Complete permit application (Electronically on flash drive/CD)
- (1) Set of bid document drawings in PDF format (Electronically on flash drive/CD)

PDS will then issue a (yellow) city building permit with permit # (UA-XX-XXXX) to the GC and also provide the bid documents to the Tuscaloosa Fire and Rescue Services (TFRS).

Note: All projects, whether a Building Permit is required or not, shall be issued a UA Inspection Card and shall be inspected by UA's 3rd Party Integrated Inspection Services with exception of PO Projects that only involve interior finishes. (i.e., paint, carpet, etc.)

Initial Construction Phase

Fire Sprinkler Contractor –
The Fire Sprinkler Contractor shall submit the following to the TFRS with attention to Fire Marshal Patrick Stines referencing the city building permit # (UA-XX-XXXX):

- (3) complete paper sets of fire sprinkler shop drawings (including Ansul system, unless pre-engineered) with the engineer of record's review stamp.

Fire Alarm Contractor –
The Fire Alarm Contractor shall submit the following to the TFRS with attention to Fire Marshal Patrick Stines referencing the city building permit # (UA-XX-XXXX):

- (3) complete paper sets of fire alarm shop drawings with the engineer of record's review stamp.

*Shop drawings are submitted to the TFRS for review and approval. TFRS will communicate all feedback to Fire Sprinkler/Fire Alarm Contractors by phone and to the UA Inspection Coordinator (UA IC) by email.

Construction Phase and Inspections

General Contractor (GC) –
The General Contractor (GC) shall request a UA Inspection Card from the UA Project Manager or UA Field Coordinator prior to any inspection requests. This card shall be posted prominently in the GC's job trailer along with an inspection set of drawings. *The GC shall submit the latest copy of the UA Inspection Card, both front and back, with each monthly GC pay-application. The monthly pay-application will not be processed if this item is not included.

GC's or Subcontractors shall request all UA Third-Party inspections, including fire protection, by contacting the UA Customer Service Center (UA CSC) between the hours of 7:30 AM - 4:30 PM (Monday-Friday, excluding both National and UA holidays) by either of the following. A minimum 24-hour notice is required.

- Email: inspections@ua.edu
- Phone: (205) 348-6001

When requesting an inspection, the following information is required (in this particular order):

- UA Project Name
- UA Project Number
- COT Building Permit Number
- Specific Trade(s) involved
- Type of inspection
- Exact location(s) within building or project site
- Desired date and time
- Contact info (Name, Phone Number, Email)

Once the UA CSC receives the requested inspection, the UA CSC will create a Work Order and assign a Work Order # to it. The UA Inspection Coordinator (UA IC) will then schedule the inspection with UA's Third Party Integrated Inspection Services and email them a copy of the respective Work Order. The inspector(s) shall perform the inspection within 24-36 hours upon the UA CSC receiving the request. The inspector shall attempt to arrive on site at the desired time of the inspection. If the desired time cannot be met, the

inspector shall contact the contractor who requested the inspection, as well as the UA IC in order to coordinate an arrival time. The inspector(s) shall be accompanied at all times during the inspection by the GC and Sub-Contractor for each trade involved.

Once on site, the inspector(s) shall thoroughly perform the inspection and note all building code and UA standard deficiencies, if any, along with photo images of deficiencies in a formal inspection report. The inspection report shall be stamped as Approved, Approved with comments or Failed; Re-inspection required.

Approved/Approved with comments: If the inspection report is stamped as Approved or Approved with comments, the inspector(s) shall sign, date and reference the Work Order # under the appropriate section(s) of the UA Inspection Card as well as highlight the area inspected referencing the Work Order # on the inspection set of drawings. The inspection report shall be sent to the UA IC within 24 hours of performing the inspection by UA's Third Party Integrated Inspection Services. The UA IC will then forward the report to the UA Project Manager, UA Field Coordinator and the contractor who requested the inspection. The UA Field Coordinator shall verify that all noted deficiencies have been corrected by the contractor prior to any covering of inspected work.

Failed; Re-inspection required: If the inspection report is stamped as Failed; Re-inspection required, the inspector(s) shall not sign and date the UA Inspection Card nor highlight the inspection set of drawings. Instead, the inspector(s) shall notify the contractor who requested the inspection while on site that the inspection has failed. The inspection report shall be sent to the UA IC within 24 hours of performing the inspection by UA's Third Party Integrated Inspection Services. The UA IC will then forward the report to the UA Project Manager, UA Field Coordinator and the contractor who requested the inspection. If the noted deficiencies can be corrected within 1 day then the contractor who requested the inspection can coordinate a time for the inspector(s) to revisit the site the following day before they leave the site. If the noted deficiencies take 2 or more days to be corrected then the contractor who requested the inspection shall request a re-inspection. The re-inspection can be requested by one of the following ways: forwarding the original inspection request email to inspections@ua.edu or calling (205) 348-6001. Either way requires specifying a re-inspection, referencing the Work Order #, re-inspection date/time and particular trades involved. A minimum 24-hour notice is still required.

Re-inspection Fee for All Trades

The initial re-inspection for each trade will be at no cost. Any subsequent re-inspections on the project for any trade having previously failed an inspection will be at a cost to the General Contractor of $300. These costs will be deducted through a change order to reduce the contract for the appropriate amount.

The GC or Subcontractors shall also directly contact and request all inspections required by the following Tuscaloosa entities:

- COT Fire and Rescue Services (TFRS)
- COT Water and Sewer Department
  - Water Distribution
  - Wastewater (Linear Assets Division) – Grease Traps
- COT Office of City Engineering (OCE)

  - Storm Water Piping, Sanitary Sewer Piping 6" or greater
- County Health Department, as applicable
- Department of Transportation (TDOT), as applicable

Obtaining the Certificate of Occupancy

General Contractor (GC) –
Planning and Development Services (PDS) will only issue a final, comprehensive Certificate of Occupancy (CO) for University of Alabama projects. PDS will not issue a temporary CO. However, UA Construction Administration (UACA) will issue a partial Certificate of Substantial Completion (COSC) contingent on the approval from the Tuscaloosa Fire and Rescue Service (TFRS), Office of City Engineering (OCE), Tuscaloosa County Health Dept. or Tuscaloosa Dept. of Transportation (TDOT), as applicable.

No later than two weeks prior to the desired date for obtaining the CO, the GC shall complete the Revenue Form and include contact info in the top right corner. The GC shall submit the Revenue Form to the City of Tuscaloosa Revenue Department located at City Hall. Suitable methods of submittal include: hand delivery, Facsimile to (205) 349-0180, or Email to Vincent Brown vbrown@tuscaloosa.com or Mike Cranmore mcranmore@tuscaloosa.com. The Revenue Department will notify PDS when the Revenue Form has been approved.

The GC shall request an application for the CO from PDS at this time. Once the GC has the CO application in hand, the GC shall then request a final inspection through the TFRS. TFRS will sign the front of the UA Inspection Card as well as the CO application upon approval of the final inspection.

The GC will then email the following to PDS in order to obtain the Certificate of Occupancy:

- (1) Complete (CO) application including all required City of Tuscaloosa Department Approvals, as applicable. (Electronic PDF format)
- (1) Complete UA Inspection Card (Electronic PDF format)
- (1) Copy of A/E Design Professionals Compliance Letters, Provided to the GC by UA (Electronic PDF format)

These documents shall be emailed to the following recipients at the PDS: Alan Boswell aboswell@tuscaloosa.com, April Falls afalls@tuscaloosa.com, Nicole Beck nbeck@tuscaloosa.com, Lakeshia Jones kjones@tuscaloosa.com and William D. Smith wdsmith@tuscaloosa.com. The subject line of the email shall read: "UA Project Name – UA Project # - UA City Permit # - Certificate of Occupancy"

Shortly after receiving all correct documents, PDS will issue the CO to the GC by email after the Revenue Form has been approved. The GC shall provide a copy of the CO to the UA Project Manager in the Close-out Documents.

Glossary

AOR	Architect of Record
CEOR	Civil Engineer of Record
City Hall	Administration Building of Municipal Government, 2201 University Blvd, Tuscaloosa, AL 35401
CO	Certificate of Occupancy
COSC	Certificate of Substantial Completion
COT	City of Tuscaloosa
GC	General Contractor
LDP	Land Development Permit
OCE	Office of City Engineering, (205) 248-5380, City Engineer – Wendy Shelby, P.E.
PDS	Planning and Development Services, (205) 248-5110, Chief Building Official – Alan Boswell
TDOT	Tuscaloosa Dept. of Transportation, (205) 248-5800
TFRS	Tuscaloosa Fire and Rescue Services, (205) 248-5420, Fire Marshal – Patrick Stines

Tuscaloosa County Health Department., (205) 562-6900

Tuscaloosa Revenue Department., (205) 248-5200, Vincent Brown or Mike Cranmore

Tuscaloosa Water and Sewer Department.
Wastewater (Linear Assets Division), (205) 248-5900
Water Distribution, (205) 248-5360

UA IC	University of Alabama Inspection Coordinator, Alison Hewson / (205) 348-1684 / ahewson@ua.edu
UA CA	University of Alabama Construction Administration
UA CSC	University of Alabama Customer Service Center
UA PM	University of Alabama Project Manager

End of Document

FOR REFERENCE ONLY. THIS FORM WILL BE COMPLETED ELECTRONICALLY AND IS ACCESSIBLE HERE OR BY REQUEST FROM THE UA PROJECT MANAGER. DO NOT SUBMIT ON PAPER. CONTACT THE UA PROJECT MANAGER WITH QUESTIONS.

CERTIFICATE OF SUBSTANTIAL COMPLETION

THE UNIVERSITY OF ALABAMA®

PROJECT NAME: _____ UA PROJECT NUMBER: _____

GENERAL CONTRACTOR: _____ UA PROJECT MANAGER: _____

GEN. CONTR. ADDRESS: _____ PROJECT ARCHITECT: _____

_____ BONDING COMPANY: _____

Substantial Completion has been achieved for: ☐ the entire Work ☐ the following portion of the Work

The Date of Substantial Completion of the Work covered by this certificate is established to be: _____

"Substantial Completion" means the designated Work is sufficiently complete, in accordance with the Contract Documents, such that the Owner may occupy or utilize the Work for its intended use without encumbrance, disruption, or interference by the Contractor in completing or correcting any remaining unfinished Work. The Date of Substantial Completion is the date upon which the contract stops and all warranties for the designated Work commence, unless otherwise agreed and recorded herein.

Exclusions & Exceptions: (list on separate page if necessary with appropriate approvals/signatures)

Architect Comments:

UA Project Manager Comments:

Director of Construction Operations Comments:

Electronic Form

Punch List: A _____ page list of items to be completed or corrected prior to the Owner's approval of Final Payment is attached hereto, but does not alter the Contractor's responsibility to complete or correct all Work in full compliance with the Contract Documents. The Contractor shall complete or correct all items on the attached list, ready for re-inspection for Final Acceptance, within 30 days after the above Date of Substantial Completion, unless another date is stated here:_____. If completed or corrected within this period, warranties of these items commence on the Date of Substantial Completion, otherwise such warranties commence on the date of Final Acceptance of each item.

RECOMMENDED BY:

Architect: _____ Date: _____

Contractor: _____ Date: _____

APPROVED BY:

UA Building Life Safety Inspector: _____ Date: _____

UA Field Coordinator: _____ Date: _____

UA Project Manager: _____ Date: _____

for UA AVP of Construction: _____ Date: _____

Electronic Form

Please note this document is not a release of liens. It is the Contractor's certification that all releases have been received. This affidavit is ineffective without the attached release of liens.

THE UNIVERSITY OF ALABAMA

GENERAL CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

PROJECT NAME: _____

UA PROJECT NO: _____

OWNER: The Board of Trustees of The University of Alabama

CONTRACTOR: _____

CONTRACT DATE: _____

State of : _____

County of: _____

The undersigned hereby certifies:

That to the best of his knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens against any property of the Owner arising in any manner out of the performance of the Contract referenced above.

EXCEPTIONS: (If none, write "None". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exception.)

_____

_____

_____

_____

_____

_____

_____

SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Contractor's Release or Waivers of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waiver of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.

CONTRACTOR:

Address:

By:

Subscribed and sworn to before me this ____ day of 2____

Notary Public: _____

My Commission Expires:

FOR REFERENCE ONLY. THIS FORM WILL BE COMPLETED ELECTRONICALLY. DO NOT SUBMIT ON PAPER. CONTACT THE UA PROJECT MANAGER WITH QUESTIONS.

LEGAL NOTICE OF COMPLETION

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, as amended, notice is hereby given that

(Contractor Company Name)

(Contractor Company Address

has completed the contract for the:

(UA Project Name)

UA Project No. _____

at **(UA Project Address)** with the completion date of **(Completion Date)** for The Board of Trustees of The University of Alabama, Owner, and has made request for final settlement of said contract. All persons having any claim for labor, materials, or otherwise in connection with this project should immediately notify the Architect/Engineer

(Architect/Engineer Company Name)

(Architect/Engineer Company Address)

PROOF OF PUBLICATION

(Not to be completed until the above notice has been posted for a minimum of 21 days.)

I, _____, as _____ for The University of Alabama, with personal knowledge of the facts stated herein, do hereby certify that the above notice was posted on the Owner's website, https://constructionpublicinfo.ua.edu, for a minimum of 21 days.

_____
(Signature)

Sworn and subscribing to me this _____ day of _____, _____.

_____ _____
Notary Public My Commission Expires

ELECTRONIC FORM

FOR REFERENCE ONLY. THIS FORM WILL BE COMPLETED ELECTRONICALLY. DO NOT SUBMIT ON PAPER. CONTACT THE UA PROJECT MANAGER WITH QUESTIONS.

LEGAL NOTICE OF COMPLETION

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, as amended, notice is hereby given that

(Contractor Company Name)

(Contractor Company Address

has completed the contract for the:

(UA Project Name)

UA Project No. _____

at **(UA Project Address)** with the completion date of **(Completion Date)** for The Board of Trustees of The University of Alabama, Owner, and has made request for final settlement of said contract. All persons having any claim for labor, materials, or otherwise in connection with this project should immediately notify the Architect/Engineer

(Architect/Engineer Company Name)

(Architect/Engineer Company Address)

PROOF OF PUBLICATION

(Not to be completed until the above notice has been posted for a minimum of 21 days.)

I, _____, as _____ for The University of Alabama, with personal knowledge of the facts stated herein, do hereby certify that the above notice was posted on the Owner's website, https://constructionpublicinfo.ua.edu, for a minimum of 21 days.

_____
(Signature)

Sworn and subscribing to me this _____ day of _____, _____.

_____ _____
Notary Public My Commission Expires

ELECTRONIC FORM

THE UNIVERSITY OF ALABAMA
MINORITY AND WOMAN-OWNED BUSINESS
(MWB) SUBCONTRACTS

General Contractor: _____

UA Project Name: _____

UA Project No: _____

Please complete the following for each Minority and/or Woman-Owned Business (MWB) to which you awarded a subcontract for the above-referenced project. If your company is an MWB, please complete one for it as well. Use as many pages as necessary.

Name of MWB: _____

MWB Type (e.g. woman-owned, minority-owned, Native American): _____

MWB Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work performed by MWB: _____

Total Amount Awarded to MWB for above-referenced project: _____

Name of MWB: _____

MWB Type (e.g. woman-owned, minority-owned, Native American): _____

MWB Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work performed by MWB: _____

Total Amount Awarded to MWB for above-referenced project: _____

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Owner-performed work.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:
1. General Conditions of the Contract.
2. Supplemental General Conditions.
3. Section 01 21 00 Allowances.
4. Section 01 23 00 Alternates.
5. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

A. Project Identification: McLure Library Addition and Renovation – Package D – Addition and Renovation.

B. Project Location: 918 University Boulevard, Tuscaloosa, Alabama 35401

C. Owner: University of Alabama, c/o Construction Administration, Box 870186, Tuscaloosa, Alabama 35487-0186

D. Architect: KPS Group, Inc., 60 14th Street South, Birmingham, Alabama 35233

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. **Scope of Work:** The Work included in the Base Bid is defined by the Contract Documents and consists of completion of building demolition and asbestos abatement, as well and the renovation of the existing 25,000 square foot building and construction of an approximately 5,000 square foot addition, plus associated sitework and landscaping. Asbestos Abatement includes materials identified in roof and glazing. Refer to alternates schedule for additional information on scope.

B. **Time of Completion:** Pending an LOI: February 23, 2024
   1. Construction Start Date (Mobilization) = April 15, 2024
   2. Final Completion = May 1, 2025

C. Liquidated Damages: $500.00 per Calendar Day after Substantial Completion.

D. Type of Contract:
   1. Project will be constructed under a single prime contract.

1.6 WORK BY OWNER (If Applicable).

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

B. The Owner will perform the following:
   1. Removal of temporary fire alarm devices.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. General: Contractor shall have limited use of Project site for construction operations as directed by Owner.

B. Working Hours: Unless otherwise stated below or elsewhere in the Contract Documents, Contractor shall have access to the building for work activities during the following regular building operating hours:
   1. 8:00 AM to 5:00 PM local time, Monday thru Friday.
   2. No deliveries between 7:30 a.m. and 8:15 a.m.
   3. Bridge Demolition: Not before Monday, May 6th, 2024.
   4. No work on Fridays before home football games.
   5. No work on the Friday before the 2024 or 2025 A-Day game.

C. Project Milestones
   1. University Boulevard Closure (west-bound lane of traffic closed): May 6, 2024 – June 1, 2024
      a. Intended to facilitate demolition of existing bridge and regrading of site.
   2. University Boulevard Closure (east-bound lane of traffic closed): June 1, 2024 – August 2, 2024
      a. Intended to facilitate demolition of existing bridge and regrading of site.
   3. Elevator shaft: Complete hoistway by November 1, 2024 for Elevator package (not in contract)
   4. Chilled water tie-in: Shut down and complete work when Owner's operations are closed. Coordinate with Owner and Architect. Anticipated to take place in November or December 2024.

D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

E. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
   2. Comply with Owner limitations on use of UA property, and requirements for maintaining vehicular and pedestrian access to facilities.

B. Work areas to be protected by Contractor:
   1. Project Site: Contractor shall restrict activities on the site to the areas identified by UA.
   2. Building Exterior: shall be protected from damage during the project duration. Maintain weathertightness of building and cap penetrations resulting from selective demolition. The contractor shall seek and receive authorization from the Owner prior to making any modifications to the exterior of the building.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than two (2) days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.

E. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
   3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
   4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

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

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
   3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Owner-performed work.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:
1. General Conditions of the Contract.
2. Supplemental General Conditions.
3. Section 01 21 00 Allowances.
4. Section 01 23 00 Alternates.
5. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

A. Project Identification: McLure Library Addition and Renovation – Package D – Addition and Renovation.

B. Project Location: 918 University Boulevard, Tuscaloosa, Alabama 35401

C. Owner: University of Alabama, c/o Construction Administration, Box 870186, Tuscaloosa, Alabama 35487-0186

D. Architect: KPS Group, Inc., 60 14th Street South, Birmingham, Alabama 35233

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. **Scope of Work:** The Work included in the Base Bid is defined by the Contract Documents and consists of completion of building demolition and asbestos abatement, as well and the renovation of the existing 25,000 square foot building and construction of a 5,000 square foot addition, plus associated sitework and landscaping. Asbestos Abatement includes materials identified in roof and glazing. Refer to alternates schedule for additional information on scope.

B. **Time of Completion:** Pending an LOI NTP NLT: March 1, 2024
   1. Construction Start Date = March 1, 2024
   2. Final Completion = TBD

C. Liquidated Damages: $500.00 per Calendar Day after Substantial Completion.

D. Type of Contract:
   1. Project will be constructed under a single prime contract.

1.6 WORK BY OWNER (If Applicable).

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

B. The Owner will perform the following:
   1. Removal of temporary fire alarm devices.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. General: Contractor shall have limited use of Project site for construction operations as directed by Owner.

B. Working Hours: Unless otherwise stated below or elsewhere in the Contract Documents, Contractor shall have access to the building for work activities during the following regular building operating hours:
   1. 8:00 AM to 5:00 PM local time, Monday thru Friday.
   2. No deliveries between 7:30 a.m. and 8:15 a.m.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
   2. Comply with Owner limitations on use of UA property, and requirements for maintaining vehicular and pedestrian access to facilities.

B. Work areas to be protected by Contractor:
   1. Project Site: Contractor shall restrict activities on the site to the areas identified by UA.
   2. Building Exterior: shall be protected from damage during the project duration. Maintain weathertightness of building and cap penetrations resulting from selective demolition. The contractor shall seek and receive authorization from the Owner prior to making any modifications to the exterior of the building.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than two (2) days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.

E. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
   3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
   4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

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

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.

3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 20 20

UTILITY SURVEYS BY CONTRACTOR

PART 1 – GENERAL

1.1 SCOPE

A. Surveying of all new and exposed existing underground utilities shall be performed by the CONTRACTOR as specified herein... Scope of workshall not include any boundary surveys.

1.2 QUALIFICATIONS

A. Surveys shall be performed by or under the supervision of (a) a Professional Licensed Surveyor registered in the state of Alabama or (b) a licensed Professional Engineer registered in the state of Alabama who is degreed in Civil Engineering and normally engaged in topographical surveying. Proof of registration shall be submitted (name and license number shall be acceptable).

1.3 STANDARD OF CARE

A. Surveys shall comply with the State of Alabama Technical Standards (ATS) for Surveying. Surveys shall be performed utilizing survey grade GPS and/or other survey grade data collection equipment capable of providing digital northing, easting, and elevation output. Surveys shall be on the UA's coordinate datum (NAD83 Alabama State Planes, West Zone, US Feet).

1.4 PHASING

A. Personnel performing surveys shall be available to perform required surveys without disruption of workflow.

PART 2 - SURVEY REQUIREMENTS

2.1 SCOPE

A. Survey all new and all exposed existing underground utilities (including abandoned utilities), except irrigation piping smaller than 2", outside the building footprint. Provide survey equipment as required for all conditions encountered.

2.2 UTILITY BACKFILL

A. NO UTILITY SHALL BE BACKFILLED WITHOUT BEING SURVEYED.

2.3 REQUIRED INFORMATION

A. Indicate type of utility, dimensions or pipe size, and material at all survey points.

2.4 SURVEY SHOTS

A. As a minimum, survey shots shall be taken at the following locations:

i. 25' maximum intervals on straight runs

ii. 10’ maximum intervals on curved portions of flexible utilities

iii. All changes in alignment (both vertical and horizontal)

iv. Changes in size and/or material

v. Connections to existing

vi. End of lines

vii. Sleeves and casings

viii. In-line valves (top of nut)

ix. Offset valves (both top of nut and center of valve body)

x. Concrete encased duct banks (edges of concrete)

xi. Electrical and OIT Manholes (corners and center of cover)

xii. Grease traps (corners and center of covers)

xiii. Storm and Sanitary Manholes (corners and center of cover, all pipe inverts)

xiv. Underground Detention (boundaries, extents, inspection ports)

xv. All above-ground system features (hydrants (top), valve boxes, meter boxes, access or inspection ports, junction boxes, cleanouts, manhole covers, etc.)

xvi. Thrust blocks: (Bottom, top, outer boundary)

xvii. Other system components

xviii. For existing crossing utilities, minimum of two shots – one at each edge of trench

xix. New Blue Phones

2.5 DIRECTIONAL BORES

A. Depth and location of bores shall be tracked and marked on the ground in accordance with the above guidelines, to be surveyed same as other utilities.

PART 3 - INFORMATION SUBMITTALS

3.1 SURVEY DATA

A. Survey data shall be submitted along with each Pay Request.

3.2 SUBMITTALS

A. Submittals shall consist of the following:

i. A site plan containing surveyed utilities in *.dwg file in AutoCAD Civil 3D format, complying with the following requirements:

a. File name shall be Project name + “Utilities” + date (example “Campus Drive Utilities 2-20-21.dwg”).

b. No External References.

c. Drawings will be created using AutoCAD Civil 3D and will retain Civil 3D Content.

d. The contract documents Site Utility Plan (AutoCAD Civil 3D), provided by the Engineer of Record, shall be used as the base plan.

e. Do not explode Civil 3D Objects or export drawings to base AutoCAD.

f. Points shall be imported into the drawing in a Point Group labeled with the date of import.

g. Utilities shall be indicated with continuous polylines interconnecting survey points. Lines for each utility shall be on separate layers with descriptive names beginning with "New" (example: "New_UAGas"). Color of layers shall be per Alabama One Call color code.

h. Drawings shall be kept current. All current survey information shall be updated prior to each monthly submittal.

i. Each submitted Drawing will be cumulative.

ii. *.txt Point File(s) in PNEZD (comma delimited) (Point Number, Northing, Easting, Elevation, Description)

a. File name shall be Project name + "Utilities" + date (example "Campus Drive Utilities 2-14-14.txt")

3.3 MEDIA

A. 100% Submittal will consist of CD/DVD and Mylar print.

END OF SECTION 012020

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Quantity allowances.
   2. Lump-sum allowances.

B. Related Sections:
   1. Section 01 22 00 - Unit Prices: Procedures for using unit prices.
   2. Divisions 02 through 49 Sections: Items of Work covered by allowances.

1.2 DEFINITIONS

A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
   1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
   1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
   1. Include installation costs in purchase amount only where indicated as part of the allowance.
   2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
   3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
   4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
   1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
   2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALLOWANCES

Allowance No. 1 - Traffic Control Signage and Barriers: Include the lump-sum of **$15,000** for pedestrian and vehicular traffic control signage and barriers. Type and location of traffic control signage and barriers will be selected by Owner.

1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 2 - Floor Leveling and Patching Material: Include in base bid **200 cubic feet** of floor leveling and patching material as specified in **"Section 03 54 16 - Hydraulic Cement Underlayment,"**

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**
2. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 3 - Additional Light Structural Steel: Include in base bid the in-place cost of **2 TONS** of Light Structural Steel (weights of less than 20 pounds per square foot) in addition to all other steel shown on the drawings or in the specifications.

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**
2. This in-place cost shall include all costs associated with the steel including, but not limited to:
   a. Steel detailing, shop drawings, material, labor, etc.
   b. This extra steel shall be installed in the building in such sizes and locations as the Structural Engineer or Architect may direct without additional cost to the Owner.
   c. Any unused portion shall be subject to credit.

Allowance No. 4 – Building Stone and Stucco Repair: Include the lump-sum of **$15,000** for repair to existing limestone, brick, and stucco trims, cornices, and copings.

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**
2. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 5 – Infilling Holes in Slabs (6" across or less): Include in the Base bid the infilling of 50 existing holes in accordance with the structural requirements.

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**
2. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 6 – Infilling Holes in Slabs (between 6" and 12" across): Include in the Base bid the infilling of 25 existing holes in accordance with the structural requirements.

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**

2. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 7 – Interior Masonry Repair, Exterior Pointing and Mortar Repair: Include the lump-sum of **$25,000** for repointing and repair of deteriorating mortar on existing building, and repair of deteriorating interior masonry requiring repair.

1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 8 – Replacement and Repair of Existing Window Blocking: Include the lump-sum of **$15,000** for replacement of existing blocking and substrates found unsuitable for attachment of new windows, as determined by window manufacturer, with pressure-treated wood blocking.

1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 9 – Unsuitable Soils: Include in base bid **500 cubic yard in place (cyip**) of unsuitable materials to excavate and dispose of off-site in the area of hardscape, concrete, foundations, or other areas as determined necessary in the field during construction by the Owner's geotechnical representative and replace with materials as specified as embankment fill in the technical specifications or other materials as approved by the Owner's geotechnical representative

1. Coordinate quantity allowance adjustment with unit price requirements in **"Section 01 22 00 - Unit Prices."**
2. All excavation, including unsuitable / unconsolidated materials, from existing ground elevation to the finished grade elevations (including excavation for any footings, foundations, temporary supports such as shoring, subgrade, concrete / pavement build-ups, etc.) shall be included in the base bid and shall not be considered as and therefore paid as Removal and Replacement of Unsuitable Materials. Following demolition, topsoil stripping in fill sections and excavation operations to finished subgrade elevations in cut-sections, the Contractor shall notify the Owner's geotechnical representative before any questionable material is excavated, so the area(s) of unsuitable unconsolidated materials may be identified. Following the removal of such material identified by the Owner's geotechnical representative, the Contractor shall once again notify the Owner's geotechnical representative before any embankment fill material is placed so the area may be delineated and removal depths measured to derive at the appropriate cubic yards of unsuitable material removal and subsequent replacement. Failure to notify the Owner's geotechnical representative and performing unsuitable excavation along with subsequent replacement material without his/her presence for measurement shall forfeit payment of that amount of unobserved work. The Owner's Representative measurement of the quantities shall be final. Haul tickets shall not be considered a valid determination of quantities. The Contractor shall anticipate and include the cubic yards of Unsuitable Materials Removal and Replacement stated below as part of their base bid. The unit price shall be used to adjust the base bid accordingly for either deductions or additions to the anticipated volume of excavation. The stability of the subgrade shall be established as per the technical specifications (proof-rolling) and / or as required by the Owner's geotechnical representative. There shall be no additional payment for removal or remediation of spoil material, unsuitable, unconsolidated materials and / or subgrade stability required due to deterioration of such subgrade associated with contractor's negligence, including but not necessarily limited to, keeping the area dewatered, grading to provide positive drainage, erosion / siltation, sumps, etc.
3. This allowance includes material cost, tools, labor, handling, installation and Contractor overhead and profit.

Allowance No. 10 – Site Improvements Adjacent to Autherine Lucy Hall: Include in base bid **$100,000** for additional undefined site work between McLure and Lucy Hall

1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

Allowance No. 11 – Selective Demolition Allowance: Include in base bid **$15,000** for selective demolition of unforeseen Mechanical, Electrical, and Plumbing materials encountered during selective demolition.

1. This allowance includes material cost, receiving, handling, installation and Contractor overhead and profit.

END OF SECTION

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for Unit Prices.

B. Related Sections:
1. Section 01 21 00 - Allowances: For procedures using unit prices to adjust quantity allowances.

1.2 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

Unit Price No. 1 - Floor Leveling and Patching Material:
1. Provide a unit price per **CUBIC FOOT** of leveling and patching material placed as specified in **"Section 03 54 16 - Hydraulic Cement Underlayment."**
2. Quantity Allowance: Coordinate unit price with allowances in **"Section 01 21 00 - Allowances."**

Unit Price No. 2 - Additional Light Structural Steel:
1. Provide a unit price per **TON** for providing and installing additional Light Structural Steel as defined in **"Section 01 21 00 - Allowances."**
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in **"Section 01 21 00 - Allowances."**

Unit Price No. 3 - Infilling Holes in Slabs (6" across or less):

1. Provide a unit price **per hole less than 6" across** for infilling the hole in accordance with the structural requirements as defined in **"Section 01 21 00 - Allowances."**
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in **"Section 01 21 00 - Allowances."**

Unit Price No. 4 - Infilling Holes in Slabs (6" to 12" across):

1. Provide a unit price **per hole 6"-12" across** for infilling the hole in accordance with the structural requirements as defined in **"Section 01 21 00 - Allowances."**
2. Quantity Allowance: Coordinate unit price with allowance adjustment requirements in **"Section 01 21 00 - Allowances."**

Unit Price No. 5 – Excavation and Replacement of Unsuitable Materials:

1. Provide all materials, equipment, tools, labor and incidentals necessary to excavate and dispose of off-site all unsuitable materials in the area of hardscape, concrete, foundations, or other areas as determined necessary in the field during construction by the Owner's geotechnical representative and replace with materials as specified as embankment fill in the technical specifications or other materials as approved by the Owner's geotechnical representative. All excavation, including unsuitable / unconsolidated materials, from existing ground elevation to the finished grade elevations (including excavation for any footings, foundations, temporary supports such as shoring, subgrade, concrete / pavement build-ups, etc.) shall be included in the base bid and shall not be considered as and therefore paid as Removal and Replacement of Unsuitable Materials. Following demolition, topsoil stripping in fill sections and excavation operations to finished subgrade elevations in cut-sections, the Contractor shall notify the Owner's geotechnical representative before any questionable material is excavated, so the area(s) of unsuitable unconsolidated materials may be identified. Following the removal of such material identified by the Owner's geotechnical representative, the Contractor shall once again notify the Owner's geotechnical representative before any embankment fill material is placed so the area may be delineated and removal depths measured to derive at the appropriate cubic yards of unsuitable material removal and subsequent replacement. Failure to notify the Owner's geotechnical representative and performing unsuitable excavation along with subsequent replacement material without his/her presence for measurement shall forfeit payment of that amount of unobserved work. The Owner's Representative measurement of the quantities shall be final. Haul tickets shall not be considered a valid determination of quantities. The Contractor shall anticipate and include the cubic yards of Unsuitable Materials Removal and Replacement stated below as part of their base bid. The unit price shall be used to adjust the base bid accordingly for either deductions or additions to the anticipated volume of excavation. The stability of the subgrade shall be established as per the technical specifications (proof-rolling) and / or as required by the Owner's geotechnical representative. There shall be no additional payment for removal or remediation of spoil material, unsuitable, unconsolidated materials and / or subgrade stability required due to deterioration of such subgrade associated with contractor's negligence, including but not necessarily limited to, keeping the area dewatered, grading to provide positive drainage, erosion / siltation, sumps, etc.
2. The amount and unit of measurement for this project shall be 250 cubic yard in-place (cyip).

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for Additive Alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
   1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
   1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

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

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

Additive Alternate No. 1 – Decorative pendant light fixtures in Education Lounge and building exterior under portico as noted on drawings.

Additive Alternate No. 2 – Provide custom snap-in head and jamb panning in lieu of custom post-set applied panning for typical exterior windows.

END OF SECTION

SECTION 01 25 13

PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for substitutions made AFTER award of the Contract.

B. Related Sections:
1. Section 01 25 14 - Substitution Request Form During Construction.
2. Section 01300 - Submittals: Requirements for submitting Submittal Schedule.
3. Section 01600 - Product Requirements: Requirements for product selection procedures.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

A. Substitution Request Form: Submit all substitution requests using the form provided in this Project Manual. Use Section 01 25 14 - Substitution Request Form During Construction.
1. Product substitutions will NOT be considered after award of the Contract unless the above substitution form is used.
2. Architect will reject incomplete forms.

B. Substitution Requests: Submit three (3) 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. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
a. Statement indicating why specified material or product 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. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
i. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
j. 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.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
m. 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.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
   a. Form of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
   1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Substitution request is fully documented and properly submitted.
      c. Requested substitution will not adversely affect Contractor's construction schedule.
      d. Requested substitution has received necessary approvals of authorities having jurisdiction.
      e. Requested substitution is compatible with other portions of the Work.

f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. 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.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
a. 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.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. 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.

C. Exceptions: The following are not considered substitutions and are not subject to requirements specified in this Section:
1. Substitutions requested during the Bidding period, and accepted prior to award of Contract.
2. Revisions to Contract Documents requested by the Owner or Architect.
3. Specified options on products and construction methods included in Contract Documents.

PART 3 - EXECUTION (Not Used)

END OF SECTION

DOCUMENT 01 25 14

SUBSTITUTION REQUEST FORM DURING CONSTRUCTION

(Contractor shall use this form for submitting substitution requests after award of Contract. Other forms of substitution requests will not be considered)

Project: McLure Library
Package D – Addition and Renovation
Tuscaloosa, Alabama

Substitution Request Number: _____

Re: _____

To: KPS Group, Inc.
60 14th Street South, Suite 100
Birmingham, Alabama 35233

From: _____

Specification Title: _____ Section: _____

Description: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New Product ☐ 1 – 4 years old ☐ 5 – 10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point by Point comparative data attached – REQUIRED BY ARCHITECT

Reason for not providing specified item: _____

_____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ___ No ___ Yes: Explain _____

_____

Savings to Owner for accepting substitution:_____ ($ _____)

Proposed substitution changes Contract Time: ___No ___ Yes [Add] [Deduct] _____ days.

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

The Undersigned Certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: _____ Signed By: _____

Firm: _____

Address: _____

_____

Telephone: _____ Fax: _____

E-mail: _____ Website: _____

Attachments: _____

_____

A/E's REVIEW AND ACTION (to be filled-in by Architect/Engineer)

☐ Substitution Approved

☐ Substitution Approved as Noted

☐ Substitution Rejected

☐ Substitution Request Received Too Late

Signed By: _____ Date: _____

Additional Comments:

☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

END OF DOCUMENT

SECTION 01300

SUBMITTALS

A. MISCELLANEOUS REQUIREMENTS:

1. Brand Names: Submit for review a list of brand name materials proposed for use under Section before any work under that Section is begun.

2. Progress Schedule: Submit per General Conditions.

3. Schedule of Values: Submit on UA provided schedule of values template or AIA Document G703. Furnish additional breakdowns as required by Article 28 of the General Conditions.

4. Closeout Submittals: See Section 01700.

5. Site Prep Approval Sign-Off Sheet: Completed by contractor and signed by Field Coordinator.

6. List of Subcontractors: Submit for approval as indicated in General Conditions.

7. Evidence of Insurance: Submit as indicated in Supplementary General Conditions.

B. SHOP DRAWINGS, SAMPLES AND MANUFACTURER'S DATA:

1. General: Submit for review as required in detail specifications, but only after affixing signature of approval thereof; otherwise material will be returned disapproved. Contractor's approval stamp must represent that the item(s) complies with specifications criteria, and has been checked and coordinated with all parts of the Work. Revise and resubmit until Architect's/Engineer's release is secured.

   Architect/Engineer will review submittals for design only, and will assume no responsibility for dimensions, quantities or erection procedures indicated. Contractor's responsibility for indicated deviations from contract requirements will not be relieved by Architect's/Engineer's review of shop drawings, etc. unless the deviation is specifically noted in the letter of transmittal, and express written approval is returned. Review of a separate item will not constitute review of an assembly in which the item functions. Submit data on all related items simultaneously so as to facilitate logical review of all items in that section are released. One copy of each submittal bearing the final review stamp of Architect/Engineer shall be kept at the project office and shall be maintained in good condition. No submittal other than those stamped "Approval as Noted" shall be on the job for any purpose.

2. Samples: Where required, submit two of each item clearly labeled as to manufacturer, quality and job. The Architect/Engineer will retain one sample for comparison with bulk shipments, and may procure certain test samples from stock piles at the job site. Failure of any item to meet specified requirements will be cause to reject for use under this contract any further materials of the same brand or make. Rejected material already incorporated shall be subject to

removal and replacement, or at the Owner's option may be left in place and Contract price adjusted.

3. Samples for Color Selection: Unless the precise color and pattern is specified, wherever a choice exists, submit accurate color and all items well in advance of the need for the first selection (not later than 30 days after award). With very minor exceptions no color selections will be made until samples for all items requiring selection have been submitted.

4. Operation and Maintenance Manuals: Operation and Maintenance Manuals are to be submitted for review and approval during construction. They are to be consolidated for the entire project and submitted in the specified format once the shop drawings and product data submissions are complete but no later than 30 days prior to contract completion date.

END OF SECTION

SECTION 01320- CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 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. Submittals Schedule.
2. Contractor's Construction Schedule.
3. Daily construction reports.
4. Field condition reports.
5. Construction Photographs.

B. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting the Schedule of Values.
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittals" for submitting schedules and reports.
4. Division 01 Section "Quality Assurance, Control, and Documentation" for submitting a schedule of tests and inspections.
5. Division 01 Section "Project Closeout" for submitting "As-Built Drawings" and "Specification Mark-ups" at Project closeout.
6. General Conditions, Article 9

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and early finish times.

2. Predecessor Activity: An activity that is linked to, and precedes, another activity in the network.
3. Successor Activity: An activity that is linked to, and follows, another activity in the network.

B. Schedule – A list of all distinct construction activities logically linked together to show the contractor's planned sequence of work.
1. Preliminary Schedule – Schedule showing the contractor's planned sequence of work for the first 90 days of the project. This schedule is to include mobilization activities and procurement activities.
2. Initial Schedule – The first schedule showing the contractor's planned sequence of all project activities. This schedule will serve as the baseline to measure progress of the work.
3. Schedule Update – An update of the initial schedule showing current progress of the project.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. These relationships, and the activity durations, are used to calculate when activities can be performed, the duration of the project, and the critical path of the project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Float: The measure of leeway in starting and completing an activity.

1.4 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and Owner/Commissioning Authorities, and other information specified.

B. Contractor's Construction Schedule: Initial (baseline) schedule, of size required to display entire schedule for entire construction period.

1. Submit to Architect and Awarding Authority 3 printed copies and 1 working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (preliminary, initial (baseline) or updated) and date on label.

C. 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.

D. Daily Construction Reports: To be completed daily by contractor’s project staff. Submit to Architect and Awarding Authority.

E. Field Condition Reports: Submit 2 copies of report to architect and 1 copy of report to UA PM at time of discovery of differing conditions.

F. Construction Photographs: To be reviewed at each project meeting and to be submitted in a binder and on an electronic disk with close-out documents.

1.5 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request. Reference section 01320 - 3.1 – A.

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

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
4. Review delivery dates for Owner-furnished products.
5. Review Allowances and time required for procurement and installation.
6. Review schedule for work of Owner's separate contracts.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for completion and startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review submittal requirements and procedures.
12. Review procedures for updating schedule.

1.6 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 all parties involved, including but not limited to the owner and subcontractors to the contractor.
    a. Submission of a construction schedule that includes subcontractor activities will imply to the owner that the contractor has acceptance of the schedule from the subcontractor(s) affected.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Use AGC's "Construction Planning & Scheduling," 2nd edition as a reference for additional definitions not included herein.

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

1. Contract completion date can be changed, at the Awarding Authority's discretion, by submission of a schedule that shows an early completion date, as allowed by the General Conditions to the Contract.

C. Activities: Activities should be broken down and organized by floor, by elevation, and by work area. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than fifteen (15) days, unless specifically allowed by Architect and Owner. An exception will be granted for procurement activities.
2. Procurement Activities: Include procurement process activities for 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.

a. Examples include, but are not limited to, structural components, limestone or pre-cast components, architectural trim, plumbing, heating/cooling/ventilation equipment, window systems, conveying equipment, specialty items, etc.

3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittals" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than seven 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.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

3. Products Ordered in Advance: Include a separate activity for each product.
4. Owner-Furnished Products: Include a separate activity for each product.
5. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

E. Milestones: Include milestones and activities indicated in the Contract Documents in the schedule, including, but not limited to the following:

1. Letter of Intent
2. Notice to Proceed
3. Mobilization / Traffic Control / Logistics / Construction Fencing / Utility Updates
4. Mock-Up Completion (exterior)
5. Slab Pours (per floor/quadrant)
6. Structure Complete
7. In-Wall Inspections (per floor/quadrant)
8. UA OIT Start Pulling Cable
9. Overhead Inspections (per floor/quadrant)
10. Roof Dry-In
11. Building Dry-In
12. Permanent Power
13. HVAC Start-Up
14. Conditioned Air
15. OIT Closet Equipment/Completion Date
16. Flooring Acclimation
17. Elevator Complete
18. Electrical Emergency Power Complete (egress lighting, exit signage, shunt trips, generator, etc.)
19. Fire Sprinkler System Complete
20. Kitchen Hood Complete
21. Data & Phone Connectivity
22. Fire Alarm Complete
23. Fire & Life Safety Inspections
    a. Items 19-23 must be complete for milestone to start
    b. Number of days required for the milestone to start before the project completion date:
        i. PO Projects – 2 days
        ii. Under $10 M – 7 days
        iii. Under $20 M – 14 days
        iv. Under $50 M – 45 days
        v. Over $50 M – 90 days

24. Commissioning and Testing
25. Owner Furniture, Furnishings, and Equipment – Tied to Elevator Usage
26. Contractor Punch List
27. Architect/Owner Punch List
28. City of Tuscaloosa Certificate of Occupancy
29. UA Certificate of Substantial Completion
30. Owner Training
31. Closeouts Completion
32. Punch Completion

F. Pre-Installation Meetings: Include Pre-Installation Meetings as indicated in the Contract Documents in the schedule, including, but not limited to, Pre-Construction Meeting, Concrete, Masonry, Structural Steel, Pre-Inspections Meeting, Metal Framing, Millwork, Waterproofing, Roofing, Fireproofing, Storefronts, Windows, Flooring, Finishes, Keying Meeting, Pre-Commissioning Meeting, Pre-HVAC Start-Up Meeting

G. Resource/Staffing: Should the contractor's progress fall materially behind the accepted initial schedule (30 days or more), the awarding authority can require the contractor to incorporate resource loading into the recovery schedule to indicate required staffing levels for each activity. This resource loading will show aggregate manpower requirements on a daily or weekly basis.

H. Cost Correlation: Provide cost correlation values, indicating planned and actual costs. Show dollar volume of the Work performed within the dates used for preparation of payment requests.

1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.

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

J. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules. See Article 9 of the General Conditions of the contract for further information.

2.2 CONTRACTORS CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost and resource loaded, time-scaled CPM network analysis program.

1. Submit schedule to the Architect and Awarding Authority in the time frame listed below.

a. For projects with a contract value of less than $5,000,000 – Initial schedule within 10 days of Issuance of Letter of intent or Notice to Proceed.
b. For projects with a contract value of $5,000,000 to $20,000,000 – Preliminary schedule within 10 days of Issuance of Letter of intent or Notice to Proceed, and Initial schedule within 30 days of Issuance of Letter of intent or Notice to Proceed.
c. For projects with a contract value greater than $20,000,000 – Preliminary schedule within 15 days of Issuance of Letter of intent or Notice to Proceed, and Initial schedule within 45 days of Issuance of Letter of intent or Notice to Proceed.

2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meetings and payment request dates.
3. Use "one workday" as the unit of time. Include a list of non-working days and holidays incorporated into the schedule.
4. Failure to include any work item required for the performance of this schedule shall not excuse the Contractor from completing all work within the applicable completion dates, regardless of Architect or Owner approval of the schedule.

B. CPM Schedule Preparation: Prepare a list of all activities required to complete the work. Determine the relationship of each activity to the other activities, and link the activities together to indicate the logical sequence of work.

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. Power outages or any utility shut downs must be given advance notice of 30 days and must be included in the CPM schedule.
h. Installation.
i. Architect and Owner Inspections.
j. Work by Owner that may affect or be affected by Contractor's activities.
k. Testing and commissioning.

2. Critical Path Activities: Clearly identify critical path activities, including those for interim completion dates. Schedule start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output on a computer-drawn,time-scaled network. Revise data, reorganize activity sequences and reproduce as

often as necessary to produce the CPM schedule so that the work is shown to be complete within the limitations of the Contract Time.

C. Initial Issue of Schedule: Sort the initial submission of the network diagram “early start” date. Identify clearly all critical activities. Show the following information on the schedule:

1. Description of the activity.
2. Contractor or subcontractor and the Work or activity.
4. Predecessors and Successors.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float for each activity.
9. Average size of workforce.

D. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports and narrative(s) 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 cost-loading or resource-loading.
8. Changes in the Contract Time.

2.3 REPORTS

K. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
   a. Personnel count is to be broken down by subcontractor.
4. All equipment at project site.
5. High and low temperatures and general weather conditions.
6. Accidents involving injury or damage to equipment or work in place.
7. Meetings and significant decisions.
8. Unusual events.
9. Inspections of the work.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures enacted.
13. Orders and requests of authorities having jurisdiction.

14. Change Orders received and implemented.
15. Construction Change Directives received.
16. Services connected and disconnected.
17. Equipment or system tests and startups.

    a. The University of Alabama intends to require the General Contractor's Daily Reporting to be done using a Call-in service administered by a third party provider. The daily reporting will be required by all Superintendents listed in the project's minimum general contractor staffing requirements.

L. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions andphotographs illustrating the existing conditions, together with recommendations for changing the Contract Documents.

M. Construction Photographs: Photographs to document pre-existing conditions and to regularly document construction progress.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Consultant: Engage a 3rd party scheduling consultant to provide planning, evaluation, and reporting using CPM scheduling.

1. In-House Option: Awarding Authority may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Float: Float is a shared resource, available to both parties as needed. The Contractor shall not sequester shared float through such strategies as (a) extending activity duration estimates to consume available float, (b) using preferential logic, or (c) using extensive crew / resource sequencing, constraints, unnecessary milestones, leads or lags on logic ties, and hammock type activities. Since Float within the Construction Schedule is jointly owned, no time extensions will be granted nor delay damages paid until a delay occurs which extends the work beyond the contract completion date. Since float within the Construction Schedule is jointly owned,it is acknowledged that Trustees-caused delays on the project may be offset by Trustees-caused time savings (i.e., critical path submittals returned in less time than allowed by the contract, approval of substitution requests and credit changes which result in a savings of time to the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive a time

extension or delay damages until all Trustee-caused time savings are exceeded and the contract completion date is also exceeded.

C. Weather Delays: The schedule must account for average weather delays for the local area. Weather delays will be calculated as days lost for events in excess of the NOAA 30 year average for Tuscaloosa, AL (1971 – 2000). Weather delays will not be granted for rain events less than 0.1 inches. Weather delays will not be granted for activities that are not shown to be on the critical path of the schedule at the time of the event.

D. Contractor's Construction Schedule Updating: At two-week intervals, update schedule to reflect actual construction progress and activities. Issue printed and electronic versions of schedule one week before each regularly scheduled progress meeting.

1. Include a report and narrative with each updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
2. As the Work progresses, indicate Actual Completion percentage for each activity.
3. At the end of the project, submit the As-Built schedule with actual start and finish dates to the owner as a close-out requirement.

E. Distribution: Distribute copies of approved schedule to Architect, Awarding Authority, separate contractors, testing and inspecting agencies, 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. Awarding Authority to receive both paper and working electronic copy of each update.
3. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

F. Construction Schedule Software:. The following CPM software shall be utilized:
   a. For projects with a contract value of less than $5,000,000 – Microsoft Project, Primavera P6, or other comparable software product.
   b. For projects with a contract value greater than $5,000,000 – Primavera P6 or other comparable software product.

3.2 CONSTRUCTION PHOTOGRAPHS

A. Photographic Process: Digital Imaging.

B. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.

C. Preconstruction Digital Photographs and Digital Video Recording: Before starting construction, take color photographs and digital video recording of Project site and affected City right-of-ways and surrounding properties and interior existing photos of affected areas from different vantage points. Show existing conditions adjacent to property.

D. Periodic Construction Photographs: Periodic digital color photographs and digital files to be submitted in duplicate on disc and in print form at each pay request with the following views:

1. Exterior views of all distinct elevations on a weekly basis. Photographs of each elevation are to be taken from the same location throughout the project.
2. Interior views of all levels of major spaces on a monthly basis. Of particular interest is the process of structure, mechanical (ductwork, equipment, plumbing, and sprinkler systems), electrical, partitions and interior finishes.
3. Roof: Views of all roof areas on a weekly basis during periods when work is occurring on or adjacent to the roof.
4. Field Office Prints: Retain one set of prints of periodic photographs in field office at Project site, available at all times for reference. Identify photographs the same as for those submitted to Architect.

END OF SECTION 01320

SECTION 01400

QUALITY ASSURANCE, CONTROL, & DOCUMENTATION

A. SUMMARY

1. This section includes administrative and procedural requirements for quality assurance and quality control.

B. GENERAL

1. Control System: The Contractor shall establish and maintain a system for documenting, monitoring, inspecting, verifying, and testing of the work and that of his subcontractors to ensure that all applicable requirements of the contract documents are met. The Contractor shall be diligent to ensure that the quality of workmanship is satisfactory, that the installation meets all manufacturer requirements, that dimensional requirements are met, that defective materials are not used, and that all required protection and control and laboratory testing procedures are effected. Where specific testing procedures are not stipulated, the Contractor shall establish and conduct a test procedure to ensure adherence to specified quality.

2. Chain of Control: The Contractor shall plan, coordinate, execute, and examine the work to ensure the complete, workmanlike, and warrantable installation of all materials in a system or element of the construction.
   a. The Contractor shall plan, coordinate, execute, and examine the work to ensure that all underlying, substrate, or contiguous work is installed as required to meet the tolerances and requirements for the correct installation of subsequent work.
      1) It is the responsibility of the Contractor to advise the Architect no later than the submittal phase of any discrepancies in the requirements or tolerances of materials or components in a system or element of the construction.

3. Mock-ups: Mock-ups shall be used to judge workmanship, execution of details, and colors for all exterior material elements. No work shall be started on any of the exterior material elements until such time the mock-up is completed by the Contractor, and accepted / approved by the University.

C. EXECUTION

1. Documentation: The documentation shall be by specification section or by system or element of the construction. The documentation shall be formatted in a comprehensive and collated manner to ensure ease of use and reference. A Table of Contents shall be provided. The Contractor's system shall include, but is not limited to the following:
   a. Pre-Installation Conference
      1) Review of b through g below
      2) Inspection and Testing requirements
      3) Correct environmental conditions for execution of the work and protection of the completed installation.
      4) Schedule including required inspections
      5) Requirements and tolerances of underlying, substrate, or contiguous work
      6) Review of requirements to ensure an enforceable warranty

      *** Manufacturers should be present whenever possible ***
   b. Specifications
   c. Submittals, Product Data, and Shop Drawings
   d. Test Results
   e. Manufacturer's Recommendations, Requirements, and Instructions

f. Packaging labels from Materials where possible
g. Periodic, Dated Photos of the work being performed and any other documentation that pertains to the warranty of the material or structure
h. Samples of the material when reasonable

2. Pre-Work Quality Control Meeting: The Contractor shall setup a meeting with the Awarding Authority, Architect, Project Superintendent, and all major trade Superintendents to review the contractor's proposed QA/QC system and requirements for compliance.

3. Submittal of QAQC Program:
   a. The Contractor shall submit for Owner's Approval their program format 10 (ten) days from Notice to Proceed.
   b. Once work has begun, the QAQC manual must be kept up-to-date and approved by Owner's Field Coordinator and Project Manager prior to the current Pay Application being approved.

4. Inspections: The Contractor shall make an initial inspection of each phase of work as soon as a representative portion has been completed, and the Contractor shall make follow-up inspections as required, to ensure that an acceptable quality of work is established and maintained.
   a. The Contractor shall perform a pre-final inspection, prepare a punch list, and work off all items prior to A/E inspection. Contractor shall provide copy of completed report, certifying it's completion to the Architect prior to the Architect beginning his inspections.
   b. The Contractor shall coordinate and plan inspections by the Architect and Awarding Authority in a timely manner to ensure that all parties can be scheduled so as not to impede the flow of the work.

5. Closeout: The documents generated through this process are to be turned in as part of the closeout documents.
   a. Provide a list of following for all equipment including but not limited to the following:
      1) Model Number
      2) Serial Number
      3) Description
      4) Contract Document Reference
   b. Filter and Belt list for each air handler

END OF SECTION 01400

SECTION 014100

SPECIAL INSPECTIONS

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.

B. SUMMARY

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

D. 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.

E. 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.

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

1. 03 3000 CAST-IN-PLACE CONCRETE.
2. 05 1200 STRUCTURAL STEEL.
3. 05 3100 STEEL DECK.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

PRODUCTS (not used)

EXECUTION

3.6 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.

A. 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.

A. 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.

B. 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.

C. 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.

5.2 STRUCTURAL OBSERVATIONS

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

5.3 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.

SCHEDULES AND FORMS (ATTACHED)

5.4 STATEMENT OF SPECIAL INSPECTIONS.

5.5 SCHEDULE OF SPECIAL INSPECTIONS.

5.6 FINAL REPORT OF SPECIAL INSPECTIONS.

END OF SECTION 014100

SECTION 01500

TEMPORARY FACILITIES

A. TEMPORARY FACILITIES

1. Safety Precautions: Provide and assume complete responsibility for such safety program and facilities as will adequately protect workmen, the public and others who may properly be about this site. In compliance with OSHA requirements, the Contractor shall conduct weekly safety meetings and submit to Construction Administration.

2. Electrical Service: Unless otherwise indicated in the construction documents, the Owner shall make available utility service to the construction area from the Owner's distribution system. Contractor shall be responsible for all cost incurred for extension of the utility service to the site/project. Contractor shall provide and install all service entrance equipment including service poles, conductors, meter base and disconnect.

   If electrical service to the site is provided by the University of Alabama distribution system, the contractor shall not include the cost for electricity during construction. The Contractor shall follow the Construction Project Energy and Utility Management Plan outlined below in Paragraph 6 for the project. The plan will be implemented by the Contractor at all times while work is taking place.

   If electrical service to the site is provided by the Alabama Power Company distribution system, then the Contractor shall be responsible for paying for and providing temporary construction power and lighting for entire job site. Coordinate with local jurisdictions and utility companies and pay all fees necessary to get temporary power to the job site. Contractor shall be responsible for all monthly utility costs for duration of project or date of substantial completion.

3. Water Services: Unless otherwise indicated in the construction documents, the Contractor will contact the City of Tuscaloosa to provide service. It is the responsibility of the Contractor to reconcile and transfer this service to the University at the Date of Substantial Completion.

   The contractor is required to have any temporary metering removed at the end of the project. Any usage cost of the temporary service is the contractor's responsibility.

4. HVAC Equipment: Do not operate any of the permanent heating, ventilation, or air conditioning equipment prior to the Pre HVAC Conference. The Contractor may schedule this meeting only after the doors and exterior windows or suitable temporary construction is in place and the area is relatively dust free. At a minimum, the floors shall be broom clean, drywall finishing and paint spraying completed.

   Prior to starting equipment, install minimum MERV 8 filters on all returns and outside air serving the air handling units. It is the responsibility of the contractor to change filters and clean coils as required until the Date of Substantial Completion.

5. Permanent Electrical Service: A permanent meter must be installed and functioning properly prior to energizing any new utility service. University of

Alabama Energy Management must be present at the start-up of this service to verify the meter is reading zero and functioning properly. If the meter is found to not function properly, the utility service will be terminated until such time that the meter is repaired. If the Utility Company provides the meter and service, it is the responsibility of the Contractor to reconcile and transfer this service to the University at time of substantial completion.

6. UA Construction Project Energy and Utility Management Plan

a. General

i. This energy management plan is to be implemented at the initiation of the project, and is to be maintained for the full duration of the project.
ii. The general contractor and all sub-contractors are expected to be conscientious of the fact that The University of Alabama is paying for certain utility costs during construction.
iii. All sub-contractors are expected to adhere to the general contractor's energy conservation plan. The contractor is required to adequately communicate the energy conservation plan to all of the contractor's and sub-contractor's employees working at the job site to ensure compliance.

b. Temporary Construction Power

i. All temporary / permanent construction power will have an appropriate electric meter installed prior to energizing power to the construction site.
ii. Contractors are to limit their consumption of construction power to only activities required to complete their contract work.
iii. Energy management shall also include any jobsite trailers. To minimize energy usage, the lighting is to be used only while trailers are occupied. The thermostat is to set at a moderate temperature when occupied, and at an energy savings level when unoccupied.

c. Temporary Lighting

i. All temporary construction lighting is to be energized at the beginning of the workday and de-energized at the end of the workday. Turning the lights out at the end of the day is to be an assigned responsibility.
ii. Temporary lighting is to be provided to meet work, safety, and security requirements. Lighting should be installed to meet the needs of the work being installed.
iii. Temporary lighting used for security must be installed so that only a small percentage of the total lighting is to remain energized after hours.
iv. The contractor is to review all lighting periodically, and repair or maintain as required. This includes replacing any burned out bulbs.

d. HVAC Systems

i. For buildings being tied into the UA central energy plant thermal water system, appropriate BTU meters are to be installed in the building thermal water piping prior to the use of chilled / hot water from the central energy plant.
ii. No HVAC equipment will be started or operated prior to the Pre-HVAC conference, which is to include the General Contractor, the

HVAC subcontractor, the architect, the mechanical engineer, UA Energy Management and UA Construction Administration.

iii. Thermal water piping systems will be flushed and cleaned prior to the start-up of any HVAC equipment. Flushing / cleaning requirements are to be addressed in detail in the Pre-HVAC Conference.

iv. Prior to start-up of heating and cooling equipment inside the building, doors and window are to be closed by some method. If the permanent windows and doors are not already installed, then temporary panels of plywood, plastic, etc. must be installed.

v. Systems for temporary air in the building are to be set at a level to conserve energy while providing necessary conditioning to meet the requirements of submittal data and contract documents. Settings should be determined based on what is needed to install the various paints, adhesives, woodwork, and other finishes per the manufactures recommendations (typically between 50 - 65 degrees during winter months, and between 75 - 85 degrees during summer months). The temperature should not set at 70 - 72 degrees just for personal comfort of those working inside the building.

vi. The contractor will submit the requirements for the actual temperatures that will be maintained inside the building, and what methods will be used to ensure the temperature is maintained at these set-points.

vii. Systems are to be protected with filter media on all return grilles and speed drives (VFDs) to provide the proper level of dust and contaminant protection required by the construction documents. The areas around HVAC return air intakes must be kept clean and the appropriate MERV 8 filter media must be used in all AHUs and associated speed drives (VFDs). The HVAC units should be turned off during any work that creates significant dust or other contaminants that can enter into the HVAC system.

viii. The contractor is responsible for daily maintenance of the required filtering and protection. Maintenance is to be done by an HVAC contractor properly trained for this activity.

e. <u>Domestic Water Management</u>

i. All temporary construction water is to be used only when needed, and all valves are to be turned off at the end of each workday.

ii. Water is not to be left running unattended for any reason.

iii. Water usage in the building is to be for final cleaning and testing purposes. No sinks, urinals, or toilets in the building are to be used by construction personnel.

f. <u>Natural Gas Management</u>

i. The construction site will have an appropriate natural gas meter installed prior to any natural gas usage.

ii. Gas will used only for testing purposes as per the construction documents unless needed for climate control.

END OF SECTION 01500

SECTION 01600

MATERIALS

A. **MATERIALS**

1. General: Material shall be new and without any indication of damage or overage. If usually packaged bring to job in original unbroken labeled containers. Materials not specified but required, shall be of a grade equal or superior to related parts of work.

2. Brand Names: Mentioned herein to establish a standard of design and quality. Except when indicated in subsequent sections in regard to each particular item. Qualified pre-bid approval may be given to various vendors at their request on products for various vendors at their request on products for which pre-bid approval is not required; such approvals will be communicated only to the vendor.

   Where three or more manufacturers are listed, the product must be furnished by one of the manufacturers so listed unless specific approval of other brand is obtained in writing. Comparison of substitute brands will be with the first name of those listed.

   By requesting approval of or by making a substitution, the Contractor shall certify that the product substituted is in all respects equal to, and will function equally well in the project, as the product specified. The Architect/Engineer, at his discretion may require the certification in writing.

   See General Conditions Par. 11 for additional requirements.

3. Installation: Install, apply, connect, clean and operate all materials and equipment per manufacturer's directions and recommendations. In event of conflict between specifications and manufacturer's directions, obtain instructions from Engineer.

4. Color Selections: The Architect's/Engineer's color schedule will be prepared for color only; it will not justify deviations from Contract requirements (such as changing of finish material, type of paint, etc.) which must be made by Change Order. Where color numbers and names conflict, secure instructions before proceeding.

5. Foreign Materials: In accordance with State Law, provide only materials manufactured, mined or processed in the United States or its territories, provided same are available at reasonable prices.

END OF SECTION

SECTION 01 70 00

PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS:

A. When project construction reaches 75% complete, a 75% Closeout Meeting with the UA Project Manager and the Contractor is required to review in detail all requirements for completing and closing out the project. When project construction reaches 95% complete, a Closeout Meeting with UA Contract Administration, the Contractor, Project Architect, and others as appropriate is required to further review requirements for project close out.

B. Except as noted, delivery of items listed hereunder are prerequisites for release of final retainage as indicated on the contractor's application for payment.

C. All required warranties and guarantees will commence upon date of Certificate of Substantial Completion.

D. Closeout Submittal Requirements:

1. (1) copy of Operation and Maintenance manuals (properly tabbed and indexed). See General Conditions of the Contract and specification sections regarding Shop Drawings & Submittals. Operation and Maintenance manuals are to be submitted during construction but no later than 30 days prior to contract completion date.
2. (1) Closeout Binder labeled "Closeouts" including UA project name and job number with all applicable items in order as listed under "Project Closeout Items"
3. Electronic closeout submittals using the PDF master templates on Sharepoint Online project site:
   - (1) copy of the Operation and Maintenance manuals
   - (1) copy of all applicable "Project Closeout Items"

E. Projects must be closed within sixty (60) days of Certificate of Substantial Completion. (This means all closeout documents have been reviewed and accepted by The Awarding Authority.)

All Commissioning in Div. 01 must be completed, except for functional testing and controls training before Substantial Completion.

F. The commissioning of Division 22, 23 and 26 must be complete, except for functional testing and controls training, prior to Substantial Completion, unless approved in writing by the Owner's Project Manager.

G. All TAB work and the commissioning of Division 01 must be complete prior to Final Completion, unless approved in writing by the Owner's Project Manager. Exceptions to this are the planned control system training performed after occupancy and any required seasonal or approved deferred testing. This includes for all systems, but is not limited to:

1. Completed and signed start-up and prefunctional checklist documentation
2. Requested trend log data
3. Submission of final approved TAB report
4. Completion of all functional testing

5. Required training of Owner personnel completed and approved
6. Submission of the approved O&M manuals
7. All identified deficiencies have been corrected or are approved by the Owner to be excepted from this milestone

H. The Owner's Project Manager will determine the date of Final Completion after reviewing the Commissioning Agent's recommendation for Final Completion.

1.02 PROJECT CLOSEOUT ITEMS:

A. Furnish the following items in order to successfully close out a project:

1. As-Built Drawings and specification mark-ups must be reviewed by project team for completeness
2. Operation and Maintenance Manuals
   a) GC to upload into active projects Closeout Documents folder on Sharepoint Online *(PDF Format)*
   b) GC to submit one (1) hard copy with closeout binder
   c) A/E to provide confirmation on letterhead that all O&M's have been uploaded to Sharepoint Online
3. Training sessions for Owner's personnel, as required per project specifications *(Attendee sign-in sheets required)*
4. Certificate of Occupancy from City *(original required)*
5. Approved HVAC Test and Balance Report and Documented Functional Performance Testing *(by the Commissioning Agent, if applicable)*
6. Control Drawings are to be complete and available for review
7. Fire Alarm Certification *(copy is acceptable)*
8. State Elevator Inspection Report
9. Boiler Inspection Report
10. UA Project Manager to complete the following:
    a) Fill out and submit State Insurance Fund Form to Risk Management five (5) UA business days prior to substantial completion
    b) Confirm Design Team submitted AutoCAD 3D *(.dwg)* files of the site plan, site utility plans and site power plans to UA Surveying. Plans to be referenced to the Alabama West Zone Grid NAD 1983.
    c) If required, complete and submit the Capital Project Report (Attachment I to Board Rule 415) to the UA System Office.
11. Construction Record Documents:
    a) "As-Built Drawings" – on Mylar reproducibles and labeled disk *(CAD format)*
       i. All field red-lines incorporated, external references bound and "As-Built" indicated in title block.

ii. Submit electronic copy to both A/E & UA plan room for approval prior to printing mylars.

b) Control Drawings (Bond Copy) – on Mylar reproducibles and labeled disk *(PDF format)*

c) Final Conformance Specifications – on labeled disk *(PDF Format)*

d) PM to provide transmittal from UA plan room confirming all of the above as received prior to closeout with Contract Administration

12. Advertisement of Completion - Certified by Tuscaloosa News *(4 consecutive weeks and must provide original signature and notary seal)*
13. UA Affidavit of Release of Liens - from GC only, on UA form *(form is available on Sharepoint Online and in project specifications)*. Release of Liens - from GC and all subs
14. GC and Subcontractor Warranties - Standard (1) year *(per Section 47 of General Conditions)* & any extended that may be required
15. Extended Manufacturer's Warranties
16. Roof Warranties - Standard Five-Year (ABC Form C-9) plus additional as specified
17. Delivery of Maintenance Stock Items as required per project specifications - Furnish signed receipts
18. Receipt for return of all keys - Transmit to UA Project Manager or Field Coordinator
19. Elevator Requirements *(if applicable, in addition to Item 9 above)*
    a) Executed elevator maintenance agreement *(copy, if applicable)*
    b) Reminder: PM to confirm all elevator submittals to UA Elevator Systems Coordinator are complete
20. Termite Contract *(copy is acceptable)*
21. Fully Executed CERTIFICATE OF SUBSTANTIAL COMPLETION
22. GC to provide copy of executed Final Change Order Form as part of close-out binder
    a) Cover sheet only with all signatures, must include all reconciliations *(previous errors, allowances and / or unit prices)*
23. CONSENT OF SURETY FOR FINAL PAYMENT *(date of Power of Attorney must be same or later than date indicated on Consent of Surety)*
24. Certification that final punch lists items have been completed
25. Utilities - Confirmation that all have been transferred into "UA" name
26. Construction Debris Report - Submit estimated tons of construction debris hauled off from project site on GC letterhead
27. Equipment List for Maintenance and Replacement Parts - Provide a list of all equipment *(i.e. water heaters, air handlers, etc.)* with model numbers, serial numbers and warranty periods. Include filter and belt list for each air handler unit.
28. Minority and Woman-Owned Business (MWB) Subcontracts Form

B. Items A.1 through A.10 above must be complete and reviewed by A/E prior to scheduling a final inspection with UA and are a condition precedent to issuing Certificate of Substantial Completion.

C. When applicable all Davis Bacon and DBE (Disadvantaged Business Enterprise) requirements must be reported and final submission on file with the UA before closeouts are considered complete.

D. Submission of other documentation may be required in the Specifications and Construction Drawings.

E. All closeout Documents are to be submitted within 45 days of substantial completion. If not submitted within 45 days the Awarding Authority, with no further notice required, may elect, at its sole discretion, acquire all outstanding required documents, and the actual cost thereof will be deducted from the contract.

1.03 INSPECTIONS

A. Final Inspection: For a Certificate of Substantial Completion (COSC) to be issued the Final Inspection must be conducted by the Architect, Engineers & UA and appropriate Public Officials upon notification by Contractor and concurrence by Architect, Engineer & UA that project is complete. Punch lists prepared at inspections shall be corrected within thirty days of the date of the COSC.

B. Year-End Inspection: To be conducted jointly by Architect, Engineer, UA and appropriate Public Officials approximately 1 year after completion and upon notice by Architect, Engineer, UA, and Public Officials. Any and all defects will be expected to be remedied as soon as possible.

END OF SECTION

SECTION 01701

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings (As-Builts)
2. Record Specifications
3. Record Product Data

1.2 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of copies: Submit copies of Record Drawings as follows:

a. Submittal to Architect: Submit one set of record mylar transparencies and one set of marked-up Record Prints. Architect will initial and date each transparency and mark whether general scope of changes, additional information recorded, and quality of drafting are acceptable. Architect will return transparencies for organizing into sets, printing, binding and final submittal.

b. Final Submittal to Owner: Submit one set record mylar transparencies and one copy of Record Drawings on compact disc in AutoCAD, latest version. AutoCAD files are to be “bound”, not in X’ref format. Print each Drawing, whether or not changes and additional information were recorded. Submit to Owner as part of Project Record Documents.

B. Conformance Specifications: Submit one electronic CD/DVD copy of Project’s Specifications in Microsoft Word format, including addenda and contract modifications. Submit to Owner as part of Project Record Documents.

C. Record Product Data: Submit one printed copy and one electronic CD/DVD copy of each Product Data Submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data in closeout binder as an insert in manual instead of submittal as Record Product Data.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings at Project Site.

1. 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.

2. 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
k. Changes made following Architect's written orders
l. Details not on the original Contract Drawings
m. Field records for variable and concealed conditions
n. Record information on the Work that is shown only schematically

3. Mark 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.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.

6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, ASI, RFIs, and similar identification, where applicable.

B. Record Drawings: When authorized, prepare a full set of mylar drawings of the corrected Contract Drawings, and record copy of all Shop Drawings.

1. Incorporate changes and additional information previously marked on Record Prints. Erase, redraw and add details and notation where applicable.

2. Refer instances of uncertainty to Architect for resolution.

3. Architect will furnish Contractor one set of Contract Drawings in electronic format, or .pdf files, for use in recording information.

4. Print the Contract Drawings and Shop Drawings for use as Record Drawings.

C. Format: Identify and date Record Drawing; include the designation “PROJECT RECORD DRAWING (AS-BUILTS)” in prominent location on the cover sheet.

1. Record Drawings: Organize into an unbound set. Place Drawings in durable tube-type drawing containers with end caps. Mark end cap of each container with identification. If container does not include a complete set, identify Drawings included.

2. Identification: As follows:

a. Project name
b. Date
c. Designation “PROJECT RECORD DRAWINGS (AS-BUILTS)”
d. Name of Architect
e. Name of Contractor

2.2 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.

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.

PART 3 – EXECUTION

3.1 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 the 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.

END OF SECTION 01701

SECTION 02 21 02

EXISTING UTILITIES

PART 1 - GENERAL

1.1 EXISTING UTILITIES

A. The Contractor shall be responsible for the protection of all existing utilities. Where existing utilities are interrupted, damaged, or taken offline for connection to other facilities, or are taken out of service for any reason associated with the work, the Contractor shall work expeditiously and non-stop thru meals, breaks, after hours, thru weekends, holidays, etc. to return the utility to service as soon as possible. Where the Contractor plans to remove existing utilities from service with the prior expressed approval of the utility and the Owner, the Contractor shall coordinate with persons, businesses, or parties that may be affected by the temporary loss of service.

   i. If shown in the drawings, the Contractor shall install all conduits, equipment pads, pedestals, etc., for each private utility company. The installation and materials shall be approved and to the satisfaction of each private utility company representative before the underground conduit system shall be turned over to each private utility company to install below ground utilities. The Contractor shall not relinquish ownership of the conduit system until all below ground utilities are pulled/installed and the systems are energized/activated, allowing the retirement of above ground utilities.

   ii. All coordination with private utility companies is the sole responsibility of the Contractor. Proper scheduling of private utility company crews to install new services and retire existing services shall rest on the Contractor's timely, advance coordination of the overall project schedule with each private utility company. There shall be no additional contract time granted for the Contractor's failure to coordinate in a timely fashion with the private utility companies.

B. Any adjustments (temporary or otherwise), protection, support, removal, relocation, or repairs, etc. to utilities shall be performed by the utility (at the expense of the Contractor). Alternatively, if the utility owner desires, such activity shall be performed by the Contractor at his expense in a manner meeting the approval of the utility.

C. Verification of Existing Utilities - Prior to any excavation, the Contractor shall be responsible for unearthing all known utilities to confirm the location and depth of such utility(s) sufficiently far enough in advance to allow for any necessary adjustment(s) of the vertical or horizontal alignment of any proposed new utility or structure, if necessary. If any such conflict(s) are discovered, all information shall be provided to the Owner’s Representative in order to allow proper time for any necessary design adjustments.

END OF SECTION 022102

SECTION 02 26 20

EXISTING UTILITIES

PART 1 - GENERAL

1.1 PAYMENT:

There shall be no separate payment for this item. The cost shall be incidental to the cost of the other work.

PART 2 - EXECUTION

2.1 EXECUTION:

A. The Contractor shall be responsible for and shall protect existing utilities. Where existing utilities are interrupted, damaged, or taken off line for connection to other facilities, or are taken out of service for any reason associated with the work, the Contractor shall work expeditiously and continuously (including through meals and around the clock) to return the utility to service as soon as possible. Where the Contractor plans to remove existing utilities from service with the prior expressed approval of the utility and the Owner, the Contractor shall coordinate with persons, businesses, or parties that may be affected by the temporary loss of service.

B. Any adjustments (temporary or otherwise), protection, support, removal, relocation, or repairs, etc. to utilities shall be performed by the utility (at the expense of the Contractor). Alternatively, if the utility desires, such activity shall be performed by the Contractor at his expense in a manner meeting the approval of the utility.

C. Contractor shall be responsible for location of all existing utilities prior to any excavation operations. UA Pre-Excavation Sign-Off Sheet shall be required.

END OF SECTION

SECTION 02 41 16

SITE DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the following:

i. Demolition and removal of existing site structures such as but not necessarily limited to light poles and bases, storm / sanitary structures, concrete and asphalt pavement, curbs, gutters, sidewalks, walls, brick columns, fencing, etc.

ii. Disconnection, capping / sealing, and removing existing site utilities.

iii. Disconnection, capping / sealing, and abandoning existing site utilities in place. This shall include grout filing the abandoned utilities entirely in place with low strength grout.

1.2 DEFINITIONS

A. Remove: Items to be removed and legally disposed of by the Contractor except any such item(s) designated to be reinstalled or reused, salvaged, or to remain property of the Owner.

B. Remove and Salvage: Items indicated to be removed and salvaged by the contractor but to remain as property of the Owner. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers. Load, transport, unload, and place in area as designated by the Owner.

C. Remove and Reinstall: Items designated to be removed and re-used and / or reinstalled by the Contractor. This shall include any and all cleaning, servicing, preparation of any such items for reuse, along with any temporary storage or protection against damage.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Owner and at the discretion and cost of the Contractor, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.

1.3 OWNERSHIP OF MATERIALS

A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

B. Historical items, relics, and similar objects including, but not necessarily limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be discovered and / or encountered during demolition or construction shall remain the Owner's property if deemed so by the Owner. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner. Cooperate with Owner's archaeologist or historical adviser prior to removal and manner in which item(s) are to be removed, transported, placed in Owner’s possession by the Contractor.

1.4 SUBMITTALS

A. Schedule and sequence of demolition activities indicating as a minimum the following:

i. Detailed sequence, complete with start and end dates and times.

ii. Indicate notification dates to the Owner and /or utility owners.

iii. Dates, times, and duration of utility service disruptions.

B. Proposed dust and noise control measures.

C. List of times to be removed, salvaged, retained by the Owner.

D. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition and construction operations.

E. Location (GPS coordinates), vertical elevation, type, size, etc. of capped utilities, either abandoned or remaining in service.

F. Landfill records for hazardous waste disposal. Documentation shall include receipt and acceptance of such material. Landfill facility shall be properly licensed to accept such hazardous waste, with proof to be included with submitted documentation.

1.5 QUALITY ASSURANCE / CONTROL

A. Comply with any and all governing State, Local, EPA notification regulations or requirements prior to beginning any demolition. Hauling and disposal regulations of authorities having jurisdiction shall also be followed.

B. Qualifications: Engage experienced personnel that have successfully completed demolition work similar in nature to this Project.

C. Pre-demolition Conference shall be scheduled simultaneously with the owner and any impacted utility owner(s) on-site a minimum of forty-eight (48) hours prior to beginning any demolition.

1.6 PROJECT CONDITIONS AND SCHEDULING

A. Evaluation of the demolition items and determination if asbestos is present shall be coordinated by the Contractor with the Owner. The Owner, or a representative of the Owner will examine and make the determination if asbestos or other hazardous material(s) exists. Should asbestos be present, it will be the Contractor's responsibility to secure pricing from a properly licensed company to perform removal and disposal of such asbestos material. It shall be the Contractor's responsibility to coordinate removal of all material. The cost of all associated work with the removal, transporting, disposal, etc. shall be the responsibility of the contractor. The Contractor shall submit to the Owner's Representative a certified letter stating that all asbestos has been removed and provide tickets for the disposal location.

B. Sale or storage of items or materials to remain the property of the Contractor once removed and salvaged by the Contractor shall be immediately removed from the project site. No on-site storage of such items or materials shall be permitted.

C. Demolition, removal, and salvage operations schedule shall not interfere with the day to day use of the

site or the surrounding areas by the Owner. All elements associated with such work shall be performed in such a manner to not disturb on-going activities of the Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 EXISTING CONDITIONS

A. Contractor shall be responsible for verifying all utilities have been property located and disconnected in areas of required demolition.

B. Contractor shall confirm the existing conditions and any necessary requirements associated with any utility outages necessary for completion of the demolition.

C. Contractor shall conduct field observations and document the condition of items designated to be demolished, salvaged, and / or re-used.

D. Contractor shall identify any potential hazards associated with the demolition activities.

3.2 UTILITIES

A. Contractor shall be responsible for the location of all existing utilities prior to beginning demolition work.

B. Disconnection and shutdown of existing utility services shall be coordinated by the contractor without the appropriate utility company and the Owner. No services shall be turned off without prior coordination, communication, and approval from the utility company(s) and Owner.

C. All utilities indicated to be removed shall be excavated and removed, as necessary. Any trench backfill shall follow the trench backfill requirements as specified in other sections of these specifications.

D. All existing utilities indicated to be abandoned in-place shall be completely filled with a low strength grout material with a liquidity as required so that all voids are filled in the abandoned utility. All existing chemicals, gases, flammables, or other dangerous materials, along with any liquids, solids, etc. shall be completely drained, purged, otherwise removed, collected, and properly disposed of before proceeding with abandoning, grout filling, or removal of such abandoned utility.

3.3 PREPARATION FOR DEMOLITION ACTIVITIES

A. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

B. Demolition operations shall be conducted in such a manner to prevent injury to pedestrians along with damage to adjacent buildings, streets, utilities, and facilities to remain. A safe and protected passage for pedestrians around the demolition area(s) shall be provided by the contractor. As a minimum, the following shall be provided:

i. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways where required by authorities having jurisdiction.

ii. Protect existing site improvements, appurtenances, and landscaping to remain.

iii. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

C. Shoring, bracing, supports, etc.: Provide and maintain any shoring, bracing, structural support, etc. as necessary to preserve the stability and prevent movement, settlement, or collapse of existing retaining walls, buildings, utilities, etc. in the area of the demolition. Any additional measures required after the initial supports have been installed will be required as deemed necessary by the Contractor, the Owner's representative(s), and / or the Owner.

D. Explosives: Use of any explosives shall not be allowed without written consent from the Owner and any authorities having jurisdiction. Consent from the owner or jurisdictional entities shall not in any way relieve the Contractor of all responsibility and liability to injuries or other damages to property due to the use of such explosives. The contractor shall be responsible for any and all pre-blasting observations, reports, documentation, etc.

E. Pollution Controls: Water mist, temporary enclosures or covers, or any other means, methods, techniques to limit the spread of dust, dirt, or debris shall be the responsibility of the Contractor.

i. Hazardous conditions such as ice, flooding, and pollution when using water shall be avoided or mitigated.

ii. Remove and haul debris in such a manner that spillage onto existing surfaces shall be prevented.

iii. Any dust, debris, dirt, etc. caused by the demolition process on existing buildings, streets, structures, vehicles, etc. shall be immediately cleaned by any and all means necessary as directed by the Owner at the sole expense of the Contractor.

3.4 DEMOLITION

A. Demolition of any items below the proposed subgrade shall be as follows:

i. Any foundation wall, footings, supports, etc. shall be removed a minimum of eighteen (18) inches below the proposed subgrade.

ii. Concrete or asphalt surface may be broken up into particle sizes as indicated in Section 31 2000, Earth Moving, for areas below the subgrade. Otherwise, all should be removed from the project area.

iii. Any items of old debris such as trolley rails and / or ties, tanks, vaults, etc. shall be completely removed unless written consent that such items may remain is provided by the Owner. Cost of any such removal shall be the sole responsibility of the Contractor.

iv. All earthen fill resulting from the demolition process shall follow Section 31 2000, Earth Moving.

B. Demolition Material Disposal

i. All material and debris removed from the project shall be disposed of off-site at a location of the Contractor's discretion. Disposal shall follow any and all local, State, or Federal requirements.

ii. No dumping of material on adjacent property(s) or burial of such material shall be allowed.

iii. Burning of perishable debris or material on-site will not be allowed unless written consent is provided by the Owner. If written consent for such burning is provided by the Owner, the contractor shall still remain responsible and liable for all pollution and environmental control of such burning activities.

END OF SECTION 024116

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Selective demolition and removal of portions of existing building elements to accommodate new building addition as indicated on drawings.

B. Related Requirements:
1. Section 01 10 00 - Summary: Restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.3 PRE-DEMOLITION MEETINGS

A. Pre-Demolition Conference: Conduct conference at Project site.
1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
4. Review areas where existing construction is to remain and requires protection.
5. Review areas where existing construction is to remain and requires protection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity to be determined by Owner.

D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

E. Predemolition Photographs or Video: Submit before Work begins.

F. Statement of Refrigerant Recovery (If applicable): Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.6 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications (If applicable): Certified by an EPA-approved certification program.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, preconstruction videotapes and templates.
   1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Be Removed or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

B. Refrigerant (If applicable): Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in “Section 01 50 00 - Temporary Facilities and Controls.”
   2. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in “Section 01 50 00 - Temporary Facilities and Controls.”

B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.7 SELECTIVE DEMOLITION SCHEDULE

A. Existing Construction to be Removed, Salvaged or Reinstalled: Refer to Drawings.

END OF SECTION

SECTION 02 82 00

ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Documents and Drawings prepared by the Owner's Architect for select renovation work apply to this Specification.

B. The Limited Asbestos-Containing Materials Survey conducted and prepared by The University of Alabama (UA) also applies to this Specification.

1.2 BACKGROUND

A. The project involves the abatement of asbestos-containing materials (ACM) from UA McLure Library. These materials are noted on the referenced abatement drawings and as described in the UA Environmental Health and Safety (EHS) sampling results report from Jay Thomas with UA's EHS. Other regulated materials (ORM) should also be removed and managed from the building prior to renovations as per KPS plans and specs.

B. A summary of the types of ACM and locations where it was observed are included in Section 1.6 of this Specification for general purposes only. Contractors should not use this ACM summary as a sole source for their abatement bids.

C. UA EHS completed survey of the area in 2023. During follow up evaluations conducted during the second half of 2023, UA EHS has noted that the metallic silver roofing bull on the exterior roof is positive. This includes exterior roofing, parapet wall, roof penetrations, and roof flashings coated with the roofing bull. A summary of the different types of ACM and approximate locations has been provided in the Sampling Reports included as attachments to this Specification.

D. The Contractor is responsible for removal of ACM and other regulated materials (ORM) from the building prior to renovation. If additional suspect ACM and/or ORM is found during asbestos abatement activities, the Contractor shall inform the UA Project Manager for further testing and guidance. Identified ACM shall be removed and disposed of as Regulated ACM (RACM). The Contractor shall be responsible for independently estimating quantities of all ACM to be removed.

E. This specification was prepared by Bhate Environmental Associates, Inc., for use in the above referenced project. Bhate's project number for the KPS UA Package D - Addition and Renovation project is BRE2023.0024.

1.3 SUMMARY

A. The intent of the abatement is to remove and dispose of ACMs and ORMs identified in the surveys and encountered during the renovation in a safe and controlled manner prior to further renovation activities, in order to conform to National Emissions Standards for Hazardous Air Pollutant (NESHAP) requirements, and to protect the workers, the occupants, the public of the adjacent properties, and the environment

B. If additional suspect ACMs or ORMs, not included in the survey provided with this specification, are found during asbestos abatement activities, the Contractor shall inform the UA Project Manager/Owner's Representative for further testing and guidance.

C. The University of Alabama (UA), KPS Group (KPS), and Bhate Environmental Associates, Inc. (Bhate), do not warrant that the provided documents comprise all ACM or ORM for this project. Should the bidders identify suspect materials not provided within the current documents, they must notify the Architect / Engineer at the time of bidding to resolve any questions.

1.4 PERFORMANCE REQUIREMENTS

A. The Contractor shall furnish all labor, equipment, materials, worker training, transportation, and disposal, and is responsible for costs, fees, licenses, and permits related to handling and disposal of ACMs. All work shall be accomplished in strict adherence to the Specification, and applicable federal, State, and local regulations.

B. The Contractor shall be responsible for contracting with an appropriate recycling/disposal company/companies, and is responsible for costs related to handling, transportation, recycling, disposal, and recordkeeping for these special wastes. The Contractor shall furnish the UA Project Manager and the Owner's Representative a copy of the waste manifest upon request.

C. **The Contractor is not to proceed with any abatement until the Owner's Representative issues a written "Notice to Proceed with Abatement" following the submission and acceptance of all required pre-work submittals.**

1.5 SCOPE OF WORK

A. The Contractor shall be responsible for compliance with federal, State, and local current requirements for removal and disposal of ACM and ORM from the building. In addition, any previously identified ACM and ORM that was hidden or inaccessible at the time the survey was conducted must be abated and disposed of within the scope of this project and should be anticipated in the bid.

B. The Contractor must visually inspect the structure to become familiar with the site conditions. No change orders will be issued due to lack of knowledge of the site conditions. The Contractor shall review available drawings and asbestos sampling information to become familiar with the location of ACM in the structure and to estimate the quantity of ACM and ORM to be removed.

C. The asbestos abatement work must be completed and each work area must pass the appropriate clearance testing prior to work being performed by other trades with the renovation.

D. The schedule of work for this project shall be coordinated with the UA Project Manager and Owner's Representatives. The Contractor will provide a detailed work schedule prior to the start of any work. Any changes to this schedule shall be reported to the UA Project Manager and the Owner's Representatives.

E. The Contractor shall comply with all security requirements as required by the Owner.

F. Other Regulated Materials (ORM)

During asbestos abatement work, removal of ceilings and select walls may be required. The contractor shall be responsible for removal of and disposal of the following items:

1. Light fixtures within structure. These light fixtures may contain regulated materials. Specifically:
   a. Fluorescent light fixture ballasts are known to contain oil with polychlorinated biphenyls (PCBs). Light fixtures demolished during the work shall be checked for the presence of PCB ballasts. All ballasts that are not clearly labeled "NO-PCBs" shall be considered as containing PCBs and handled appropriately.
   b. Fluorescent light bulbs may contain mercury and mercury vapors. Bulbs are to be collected without breakage for disposal.
2. Mercury controller switches, such as those associated with HVAC equipment, may be encountered, and shall be handled appropriately without breakage by recycling.
3. Refrigerants associated with large coolers and air conditioning equipment such as compressors shall be managed as per regulations for disposition of said materials prior to recycling or disposal.
4. Electronics (E-Waste) including keyboards, monitors, AV equipment, communications equipment, control panels, servers, routers, hubs, printers, batteries, etc., shall be collected and sent to a recycler for proper dismantling, sorting, and diversion of raw materials.
5. Chemicals and compressed gases should be returned to UA for use in other areas of the campus, properly packaged and disposed, or returned to the manufacturer/distributor for proper disposal.

1.6 LOCATION OF IDENTIFIED ACMS

A. Based on the asbestos sampling survey, friable and non-friable asbestos-containing materials were identified and will require abatement prior to renovation. All Contractors submitting a bid for abatement and disposal of these materials must visit the subject site, estimate, and verify the quantity of ACM onsite. Refer to the attached sampling report for the types and locations of materials to be abated.

B.

Material Identified	Location	Friable / Non-Friable
Window Glazing	Throughout Building	Non-Friable
Metallic Silver Roofing Bull	Around penetrations, flashings, and parapet wall of exterior roof	Non-Friable

C. Based on the surveys, the remaining samples either contained no detectable asbestos, or contained asbestos at below the required 1% to be considered an ACM. The sampling report(s), completed in 2023, are attached to this section of the Project Manual.

D. It should be noted that other ACMs including floor tile and mastic, textured ceilings, plaster walls, ceiling tile mastic, and piping insulation were removed from the McLure Library under a previous contract.

1.7 REGULATIONS

A. The Contractor shall comply with applicable federal, State, and local laws and regulations concerning environmental pollution control, asbestos abatement, and structure renovation, as well as the specific requirements stated elsewhere in the Contract Documents. The Contractor shall be familiar with the following applicable codes and regulations. The most recent issue of each document shall govern. Where

conflict exists among various requirements or with these specifications, the more stringent requirements shall apply.

1. TITLE 29, CODE OF FEDERAL REGULATIONS (CFR), U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS
    a. Section 1910.20 Access to Employee Exposure and Medical Records
    b. Section 1910.134 Respiratory Protection
    c. Section 1926.21 Safety Training and Education
    d. Section 1926.59 Hazard Communication
2. TITLE 40, CFR, U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA) STANDARDS.
    a. Part 61 Subpart A National Emissions Standard for Hazardous Air Pollutants - General Provisions
    b. Part 61 Subpart M National Emission Standards for Hazardous Air Pollutants - National Emission Standard for Asbestos
    c. Part 763 Asbestos-Containing Materials in Schools
    d. Part 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
    e. Part 273 Standards for Universal Waste Management Part 261 Identification and Listing of Hazardous Waste
3. TITLE 49, CFR, U.S. DEPARTMENT OF TRANSPORTATION (DOT) STANDARDS.
    a. Part 171 Hazardous Substances
    b. Part 172 Hazardous Materials Tables and Hazardous Materials Communications Regulations
    c. Part 173 Shippers - General Requirements
4. STATE AND LOCAL REQUIREMENTS
    a. Abide by all State and local requirements which govern renovation, asbestos abatement work, or hauling and disposal of asbestos waste materials

1.8 LICENSE REQUIREMENTS

A. The Contractor shall hold current licenses as required by the State of Alabama including a General Contractor's license if necessary

1.9 AGENCY NOTIFICATIONS

A. The Contractor shall be responsible for obtaining the necessary permits at their expense from the proper agencies within 10 days after the notice to proceed with the Contract pursuant to asbestos removal, renovations, hauling, and disposal. Further, the Contractor shall provide timely notification at their own expense of asbestos removal, renovations, hauling, and disposal as may be required by federal, State, regional, and local authorities.

B. Prior to commencement of asbestos abatement work, the Contractor shall send written notice of the proposed abatement work to the agencies and offices listed below. The listing of applicable agencies and offices is as follows:

Air Pollution Program
Alabama Department of Environmental Management
Air Division

Mary Kathryn Holt– UA Project Manager (Owner's PM)
UA Construction Administration
University of Alabama
Tuscaloosa, AL
205.348.2663 / 256.710.5834
email: zickl001@UA.edu

Mr. Richard Pitts – KPS Project Manager (Architect)
KPS Group
60 14th Street South, Suite 100
Birmingham, Alabama 35233
Phone: 205.458.3237 / 205.251.0125
email: RPitts@KPSGroup.com

Mr. Stephen Acreman– Program Manager (Engineer)
Bhate Environmental Associates, Inc.
1608 13th Avenue South, Suite 300
Birmingham, Alabama 35205
Phone: 205.918.4006 / 334.559.2097
email: SAcreman@bhate.com

C. The notice shall be received by each party at least 10 working days before the start of asbestos abatement work

D. Notify the UA Project Manager and the Owner's Representative 48-hours prior to scheduled commencement of the Work. Such notification may be by telephone or email. Notification shall reference the work schedule. The Owner's Engineer will make pre-work inspection to document that proper preparations are in place and that the abatement process is ready to begin.

E. Notify the UA Project Manager and the Owner's Representative of area air monitoring results within 24-hours of receipt. Such notification may be by email. The notification shall reference the work area identification, sample results and other pertinent information

F. Provide written notification of schedule changes or any changes in the inspection findings to the agencies and offices requiring notification under this Section

1.10 DEFINITIONS

A. The following commonly used terms are defined in the context of these specifications.
   1. Abatement: Procedures to control or decrease fiber release from asbestos-containing building materials or insulation material containing asbestos. Includes removal, enclosure, and encapsulation
   2. Adequately Wet: A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-019 that means to sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible airemissions are observed coming from ACM, then that material may not have been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

3. Air Filtration Device (AFD): A portable local exhaust system equipped with High-Efficiency Particulate Air (HEPA) filtration, capable of maintaining a constant low velocity air flow into contaminated areas from adjacent, uncontaminated areas and capable of maintaining a negative air pressure with respect to the adjacent, uncontaminated areas.
4. Air Lock: A system for permitting ingress or egress to the work area while allowing minimal air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways placed a minimum of 3 feet apart.
5. Air Monitoring: The process of measuring the fiber content of a specific volume of air in a stated period of time. Personal air sampling results shall be calculated to reflect the employee's 8 hour time weighted average (TWA) exposure.
6. Air Monitoring Specialist/Firm: An authorized and qualified person or firm contracted or employed by the Contractor to conduct air monitoring.
7. Amended Water: Water to which a surfactant has been added to decrease the surface tension to 35 or less dynes.
8. Asbestos: The asbestiform varieties of serpentine (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, and actinolite-tremolite. For purposes of determining respiratory and worker protection both the asbestiform and non-asbestiform varieties of the above minerals and any of these materials that have been chemically treated and/or altered shall be considered as asbestos.
9. Asbestos-Containing Building Material (ACBM): Surfacing ACM, thermal system insulation (TSI) ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.
10. Asbestos-Containing Material (ACM): Any material containing more than 1 percent (%) by weight of asbestos of any type or mixture of types.
11. Asbestos-Containing Waste Material: Any material which is or is suspected of being or any material contaminated with an ACM which is to be removed from a work area for disposal.
12. Asbestos Debris: Pieces of ACBM that can be identified by color, texture, or composition, or means dust if determined by an accredited inspector to be ACM.
13. Asbestos Removal Encapsulant: A chemical solution used in place of amended water during asbestos removal to penetrate, bind, and encapsulate the ACM.
14. Authorized Visitor: The Owner or the Owner’s Representatives or representatives of any regulatory or other agency having jurisdiction over the project
15. Barrier: Any surface that seals off the work area to inhibit the movement of air.
16. Breathing Zone: A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.
17. Class I Asbestos Work: Work as defined by OSHA in Standard 29 CFR §1926.1101(b) as being activities involving the removal of TSI and surfacing ACM and presumed asbestos-containing material (PACM).
18. Class II Asbestos Work: Work as defined by OSHA in Standard 29 CFR §1926.1101(b) as being activities involving the removal of ACM which is not TSI or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, asphaltic roofing, asbestos cement roofing and siding shingles, and construction mastics.
19. Competent Person: Definition and responsibilities as set down in 29 CFR §1926.1101(b) and as outlined herein. One who is capable of identifying existing asbestos hazards and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR §1926.32(f), and for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA’s Model Accreditation Plan (40 CFR Part 763) for supervisor, or its equivalent.
20. Critical Barrier: An airtight seal that covers openings along the perimeter walls, ceiling and floor of the work area. The critical seals consist of one layer of reinforced fire-retardant plastic sheeting that covers each opening. Critical seals are established prior to plasticizing the work area.

21. Curtained Doorway: A device to allow ingress or egress from one room to another while permitting minimal air movement between the rooms.
22. Decontamination Enclosure System: A series of connected rooms for the decontamination of workers (a Personnel Decontamination Enclosure System) or of materials and equipment (Equipment Decontamination Enclosure System).
23. Differential Air Pressure Recording Device: A device capable of producing a continual strip record, in increments of 0.001 inches of water of the pressure differential between the containment area (work area) and the ambient air pressure.
24. Disposal Bags: Properly labeled 6-mil thick leak-tight plastic bags used for transporting asbestos waste from regulated area to the disposal site.
25. Engineer: The Owner's Representative who is authorized to exercise general administration and supervision of the work under the direction of the Owner.
26. Equipment Decontamination Enclosure System: A decontamination system for waste materials and equipment, typically consisting of a designated area of the work area, a washroom, and a holding area, with an air lock between any two adjacent rooms and a curtained doorway between the holding area and the non-work area. Not to be used for personnel entry/exit.
27. Excursion Limit: No employee shall be exposed to an airborne concentration of asbestos in excess of 1.0 fibers per cubic centimeter (f/cc) of air as averaged over a sampling period of 30 minutes.
28. Fixed Object: A unit of equipment or furniture in the work area, which cannot be removed from the work area.
29. Friable ACM: A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-018 that means any material containing more than 1 % asbestos as determined using the method specified in CFR 40 Part 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
30. Full Facepiece High Efficiency Respirator (FFHER): A respirator which covers the wearer's entire face from the hairline to below the chin and which is equipped with a HEPA filter.
31. Half Mask High Efficiency Respirator (HMHER): A respirator which covers one-half of the wearer's face, from the bridge of the nose to below the chin, and is equipped with HEPA filters.
32. Hazardous Material: In this plan, hazardous material refers to PCBs, mercury switches, and fluorescent bulbs that will require assessment prior to the renovation of the building.
33. HEPA Filter: A filter capable of trapping and retaining 99.97% of asbestos fibers 0.3 microns in diameter.
34. HEPA Vacuum Equipment: HEPA filtered vacuuming equipment having an Underwriters Laboratories, Inc. (UL) 586 filter system capable of collecting and retaining asbestos fibers.
35. Lockdown: Procedure of applying an encapsulant as a protective coating or sealant to a surface from which ACM has been removed in order to control and minimize airborne asbestos fiber generation that might result from residual asbestos-containing debris.
36. Movable Object: A unit of equipment or furniture, which can be removed from the work area.
37. Negative Initial Exposure Assessment: A demonstration by the employer that employee exposure during an operation is expected to be consistently below the permissible exposure limit (PEL).
38. Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere and negative during inhalation in relation to the air pressure of the outside atmosphere.
39. Permissible Exposure Limits: PELs shall be as determined using the Sampling and Analytical Procedure as promulgated in 29 CFR §1926.1101, Appendix A.
40. Personal Monitoring: Sampling of the asbestos fiber concentrations within the breathing zone of an employee.
41. Personnel Decontamination Enclosure System: A decontamination system for personnel and limited equipment, typically consisting of an equipment room, shower room, and clean room, with an air lock between any two adjacent rooms, and a curtained doorway between the equipment room and the

work area, and a curtained doorway between the clean room and the non-work area. The decontamination system serves as the only entrance/exit for the work area.

42. Plasticize: To cover floors and walls with plastic sheeting as herein specified.
43. Powered Air Purifying Respirator (PAPR): Either a full facepiece, helmet, or hooded respirator that powers breathing air to the wearer after the air has been purified through a HEPA filter.
44. Pressure Differential and Ventilation System: A local exhaust system, utilizing HEPA filtration capable of maintaining a pressure differential with the inside of the Work Area at a lower pressure than any adjacent area, and which cleans recirculated air or generates a constant air flow from adjacent areas into the Work Area.
45. Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.
46. Regulated ACM (RACM): Includes: a) friable asbestos material; b) Category I non-friable ACM that has become friable; c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or; d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of renovation or renovation operations.
47. Regulated Area: Area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulates. Requirements for regulated areas are set out in 29 CFR §1926.1101(e).
48. Removal: The act of removing and transporting asbestos-containing or asbestos-contaminated materials from the work area to a suitable disposal site.
49. Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.
50. Thermal System Insulation: ACM applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.
51. Time Weighted Average: The average concentration of a contaminant in air during a specific time period.
52. Time Weighted Average Limit: No employee shall be exposed to an airborne concentration of asbestos in excess of 0.1 f/cc of air as an 8 hour TWA.
53. Wet Cleaning: The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with amended water or asbestos removal encapsulant and by afterwards disposing of these cleaning tools as asbestos-contaminated waste.
54. Work Area: Designated rooms, spaces, or areas of the project where asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions. A Contained Work Area has been sealed, plasticized, and equipped with a decontamination enclosure system. A Non-Contained Work Area is an isolated or controlled-access area which has not been plasticized.

PART 2 - PROJECT EXECUTION

2.1 GENERAL WORK REQUIREMENTS

A. Supervision and Quality of the Work
   1. From the start of work through completion of the project, the Contractor shall have onsite a responsible and competent Superintendent. The Superintendent will be the Contractor's representative at the site, shall have authority to act on behalf of the Contractor, and shall retain

complete jurisdiction over the work. All communications to the Superintendent by the Owner shall be binding as if given to the Contractor.

2. The Superintendent shall supervise, inspect, and direct the Work competently and efficiently, devoting such skills and expertise as may be necessary to perform the Work in accordance with this Specification.

B. Contractor's Use of Site
1. Operations at the site shall be confined to the areas permitted under the Contract. Compliance with all site rules and regulations shall be maintained while engaged in project work.
2. During the abatement process, the floors of the structure will be vacant.
3. The Contractor shall coordinate the work schedule with the UA Project Manager.
4. An area will be designated for staging of the Contractor's equipment during mobilization, load-out and demobilization only. Use of other areas is prohibited. The location and extent of the staging area will be approved by the UA Project Manager during the preconstruction meeting. Other issues to discuss during the preconstruction meeting include access to the work area, waste load-out procedures, and location of the decontamination unit.

C. Stop Work Order
1. Non-Contained Work Areas: The UA Project Manager or Owner's Representative will stop the work should any visible fugitive dust emissions from the component removal process is observed. Work shall not resume until the condition(s) causing the fugitive dust emissions are corrected by the Contractor and affected areas have been cleaned.
2. Emergency Procedures: During abatement of ACM, any condition which may require additional controls and protection shall be discussed with the UA Project Manager or the Owner's Representative. Work shall not resume until authorized to do so by the Owner's Representative.

D. Daily Meetings
1. If requested, the Contractor shall conduct site operations meetings onsite at a time and location agreed upon with the Owner and the Owner's Representative. The Contractor shall discuss the progress of the work and coordinate his daily work schedule with the Owner and the Owner's Representative

2.2 PROJECT RECORDS

A. Project Documentation
1. The Contractor shall maintain on the project site a daily log documenting the dates and times of the following;
   a. Meetings: purpose, attendees, brief discussion
   b. Personnel, by name and unique identifying number, entering and leaving the work area
   c. Special or unusual events, equipment failures, accidents
   d. Removal of waste materials from the work area
   e. Inspections and release of the work area for renovation

B. Post Project Documentation
1. The Contractor shall provide the requested documentation to the Owner within 2 weeks of substantial completion of the asbestos abatement work. Provide the following documents:
   a. A copy of all approved submittals
   b. Copies of all documents required by the specifications including:
      1) Daily Logs,
      2) Special Reports,

3) Inspection Certifications,
4) Waste Disposal Receipts, and
5) Daily Work Area Strip Charts, if applicable.

C. Special Reports
1. If an accident, personal injury, or an event of unusual and/or significant nature occurs at the site, the Contractor shall prepare and submit a special report listing the chain of events, persons participating, response by the Contractor's personnel, and similar pertinent information.
2. If an unusual condition is discovered during the work, prepare and submit a report indicating the condition discovered.
3. If hazardous conditions, hazardous materials or hazardous wastes are unexpectedly uncovered during the work, the Contractor shall stop all work in connection with such hazardous conditions and immediately notify the Owner. Submit a report indicating the condition discovered and details of the actions taken as soon as possible but no later than 24 hours.

D. Pre-Work Submittal
1. The following documentation should be submitted for review 10 days prior to the start of work at the site. Submittals may be provided as hard copy or electronic copy. In preparation of the submittal, **ensure that any Sensitive Personal Information has been redacted**. A copy of the submittal should be maintained onsite and current for review upon request for the duration of the abatement activities.
a. Health and Safety Plan: Written Health and Safety Plan addressing procedures for workplace safety. Address how physical and health hazards associated with the work are identified and communicated to employees, and the name of the person responsible for implementation of the Health and Safety Plan. Address procedures for using scaffolds, hoists, and ladders safely, electrical safety procedures, and guidelines for protection from noise, heat stress, chemical exposure, and trip/fall hazards.
b. Contingency Plan: Written Emergency Action Plan outlining the actions to be performed for emergencies including fire, accident, or unexpected asbestos contamination in the adjacent site area and on the adjoining grounds. This Plan shall identify the way emergencies are announced, emergency procedures and persons responsible for rescue, medical duties, and fire prevention.
c. Work Plan: Provide a work plan indicating the sequencing of the removal activities, description of the abatement area containment methods, description of the work methods and removal procedures to be used, description of the waste handling and preparation for disposal, location of work area entrance and egress points, location of decontamination unit(s), location of AFDs, methods and locations of waste containment, conveyance, and collection devices (i.e. roll-offs) and drawings showing the regulated area.
d. Project Schedule: Schedule showing the order in which the Contractor proposes to carry out the work, the date he will start work, and the projected date of completion for each work area, as necessary. The Contractor shall provide the specific hours the Contractor intends to work onsite, and the number of personnel to work each shift.
e. Notifications: Proof of written pre-work notification submitted to agencies requiring notification under Paragraph "Agency Notifications".
f. Contractor’s License: Copies of licenses specific to construction/renovation and asbestos abatement for the state in which work is to be performed.
g. Respirator Program: Written respiratory protection program as required by OSHA regulations. Respirator fit test verification required for asbestos abatement workers.

h. Employee Information: The contractor should provide the following information for each employee assigned to perform asbestos abatement work at this jobsite. The information should be arranged by employee.
   1) Training Certificates: Copies of all supervisors' and workers' training certificates and any annual re-accreditation records which demonstrate receipt of EPA-approved or OSHA mandated training courses required to perform asbestos-related work.
   2) Proof of Accreditation: Copies of State accreditation (may be a certificate or copy of card).
   3) Physician Statement: Copies of current (within the preceding 12 months) physician statements for each employee assigned to perform asbestos abatement work for this project and to perform work under respirator protection stating that employee can work in a respirator. To comply with HIPAA, no medical information should be included. The form should only include a statement from the physician that the employee has been examined and determined fit for the tasks required for this scope of work.
   4) Fit Test: Copy of proof of fit testing (must not be older than 12 months).
   5) Certificate of Worker's Acknowledgment: Provide completed Worker's Acknowledgment for each employee to work onsite (see Section 4 of this Specification for example form).

i. Product Information: Provide a complete product list including name of material and the manufacturer's name for all materials to be brought to the site. Provide a Safety Data Sheet (SDS) for materials, if applicable. Provide additional information if requested.

j. Waste Handling and Disposal: Written procedures for waste load-out, temporary storage, transportation, and location of disposal site.

k. Respiratory Protection Justification: Provide completed Respiratory Protection Justification prior to beginning work (see Section 5 of this Specification for example form).

l. Monitoring Subcontractor: Provide company information along with credentials for the 3rd Party Subcontractor managing the sampling and testing for all personnel.

2. The Owner's Representative will review the Contractor's pre-work submittal and issue a letter of acceptance or notice of deficiencies to the Contractor within two business days of receipt.

3. Contractor shall not proceed with any abatement until the Owner's Representative has reviewed and accepted all pre-work submittals.

E. During Work Submittals

1. Provide the following submittals via email during performance of the work.

   a. New Personnel: Names of new personnel assigned to the project during the work. Submit required documentation of training 24 hours in advance of mobilization of new personnel to project site.

   b. Any changes in the Project Schedule proposed by the Contractor for the work shall be submitted for approval as soon as practicable after a change in schedule is required. A revised Progress Schedule reflecting actual progress of the work and corrections for the remaining schedule shall be submitted at the end of each week.

   c. OSHA Monitoring Results: Provide a copy of the personnel air monitoring results to the Owner and Owner's Representative. Also ensure that those results are posted within 24 hours of collection.

   d. Special Reports shall be submitted as soon as practicable following the incident.

   e. Landfill Receipt: Receipts from the landfill operator that acknowledge delivery of material, shall be submitted within 3 days following removal of ACM from the structure.

   f. Waste Shipment Records: Copy of completed Waste Shipment Record form and landfill receipts.

F. Post Work Submittals
   1. Provide the following submittals within 14 days of completion of the work.
      a. Notifications: Copy of all notifications submitted to agencies requiring notification under Paragraph "Agency Notifications".
      b. Logbook: Copy of all entries made in site log.
      c. Reports listed in the paragraph for Post Project Documentation.

2.3 MATERIALS AND EQUIPMENT

A. Materials and equipment to be furnished by the Contractor for the work shall be installed according to the manufacturer's written instructions. Provide the following as required for the project:
   1. Barrier: A physical obstruction that is intended to prevent persons from accidentally falling or walking through floor openings.
   2. Communications Equipment: Devices suitable for inter-room communications, such as "walkie-talkies" or "radio band" communicators shall be provided as necessary.
   3. Disposal Bags: Plastic Disposal Bags shall be a minimum of 6-mil in thickness. Markings and labels on disposal bags and shipping containers shall bear danger labels, transportation packaging marking and labels, and generator identification information. Markings and labels shall be permanently affixed to all bags and shipping containers containing ACM, in accordance with OSHA Standard 29 CFR §1926.1101(k)(7), DOT Standard 49 CFR Part 172, and EPA Standard 40 CFR §61.150(a)(1)(v).
   4. Duct Tape: Duct tape shall be capable of sealing joints of adjacent sheets of plastic sheeting and shall be capable of adhering under both dry and wet conditions. Minimum physical properties: adhesion to steel - 45 ounces per inch width (ASTM International [ASTM, formerly American Society for Testing and Materials] D-3330); tensile strength at break - 36 pounds per inch width (ASTM D-3759); elongation at break - 10% (ASTM D-3759).
   5. Encapsulants: The encapsulant shall carry a Class "A" fire resistance rating and shall have an ASTM E-162 flame spread index of 15 or less. A tint shall be given by the Contractor to the encapsulant by means of the addition of non-toxic, nonflammable colorings before application. The encapsulant shall be installed according to the manufacturer's written instructions.
   6. Fire Extinguisher: Type "ABC" dry chemical extinguisher or a combination of several extinguishers of NFPA recommended types for the fire hazard exposures in each extinguisher location shall be provided. Minimum size of extinguisher shall be 4A, and 40B:C. A minimum of one extinguisher shall be provided for every 1,500 square feet of floor area, with a maximum travel distance to an extinguisher of 75 feet. At least one extinguisher shall be provided in each decontamination enclosure. The extinguisher shall be placed in the clean room.
   7. Fire-Retardant Plastic: Plastic or polyethylene sheet used for general work area plasticizing shall be minimum 6 mil flame retardant plastic sheeting that meets the National Fire Protection Association (NFPA) 701 Large-Scale test requirements.
   8. Foam Sealant: Foam Sealant shall be expanding urethane Class 1 foam sealant with a UL 723 flame spread index of 25 or less, smoke developed index of zero, and a minimum operating temperature range between -100 degrees Fahrenheit (ºF) and 250ºF.
   9. Mastic Remover Solvent: Mastic remover solvent shall be non-hazardous material and must remain non-hazardous after use.
   10. Other Materials: All other materials, such as lumber, plywood, tools, adhesive, nails, hardware, etc., required to perform the work described in this section shall be provided. Materials and equipment shall be new or used, uncontaminated by asbestos, in serviceable condition, and appropriate for the intended purpose.
   11. Plywood: Plywood used for temporary partitions shall be minimum 3/8-inch C-D exterior grade.

12. Scaffolding: Provide scaffolding, ladders and or staging equipment, as necessary to accomplish the work. Scaffolding may be of suspension type or standing type such as metal tube and coupler, tubular welded frame, pole or outrigger type or cantilever type. The type, erection requirements, and use of scaffolding shall comply with applicable OSHA provisions. Rungs of metal ladders, scaffolds, and all surfaces of such equipment subject to foot traffic shall be equipped with a nonskid surface. Temporary hand railing systems may need to be installed on stairways.
13. Spray Adhesive: Spray Aerosol Adhesive shall be specially formulated to stick to sheet polyethylene. The product shall contain no methylene chloride or restricted chlorofluorocarbons (CFCs).
14. Spraying Equipment: Equipment used to apply amended water or removal encapsulant shall be of a low pressure type to prevent disturbance of the asbestos prior to physical controlled removal. Asbestos encapsulant shall be spray-applied by an airless method.
15. Surfactant: Surfactant (Wetting Agent) shall consist of resin materials in a water base, which have been tested to ensure materials are non-toxic and non-irritating to skin and eyes. Surfactant shall be installed according to the manufacturer's written instructions.
16. Temporary Partitions: Temporary partitions shall extend from the floor to the ceiling and form an airtight seal. They shall be built using wood or metal framing at 24 inch on-center faced with plywood sheathing on both sides, and shall be braced as necessary. Both sides of the temporary partition shall be covered with a double layer of 6 mil plastic sheeting, with joints staggered and sealed with tape. Edges of the temporary partition at the floor, walls, and ceiling shall be taped and caulked airtight.
17. Temporary Enclosures: Construct using wood, metal or plastic pipe framing with plastic sheeting mounted on the interior of the work area. Provide curtain doors for entrance into temporary enclosures.
18. Visual Barrier: Black plastic or similar opaque material to act as a visual screen. Barrier height shall be 6 feet. Mount visual barrier on metal fence posts. Provide warning signs on visual barrier.
19. Signs: Warning Signs shall be posted at the perimeter of the regulated area prior to abatement operations in accordance with OSHA Standard 29 CFR §1926.1101. Danger sign format and color shall conform to OSHA Standard 29 CFR §1926.200. The signs shall display the legend indicated below:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

20. Warning signs shall be posted outside all entrances and exits to the property, warning that renovations work is being conducted.
21. Danger labels format and color shall conform to 29 CFR §1926.200. Danger labels shall display the following legend/information in accordance with OSHA 29 CFR §1926.1101(k)(7):

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

22. Generator identification information shall be affixed to each package. DOT label format and color shall conform to DOT Standard 49 CFR §172.304. Generator identification information labels shall display the following legend/information in accordance with EPA 40 CFR §61.150(a)(1)(v):

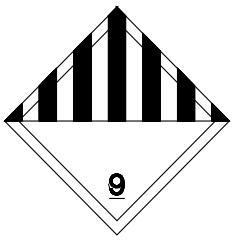
GENERATOR'S NAME: _____
FACILITY ADDRESS: _____
DATE: _____

DOT Markings and Labels: Markings and Labels shall be permanently affixed to all bags and containers containing ACM, in accordance with DOT 49 CFR §172.304 and 172.407. Markings shall display the following text:

23. DOT Markings and Labels: Markings and Labels shall be permanently affixed to all bags and containers containing ACM, in accordance with DOT 49 CFR §172.304 and 172.407. Markings shall display the following text:

RQ, ASBESTOS, 9, NA 2212

24. Labels shall be diamond shape and shall be located near the marking text. Labels shall consist of a diamond a minimum of 100 millimeters (mm) on each side with each side having a solid line inner boarder 5.0 to 6.3 mm from the edge. The label shall be white with seven black vertical stripes on the top half. Black stripes and white spaces shall be equally spaced. The lower half of the label shall be white with the class number "9" underlined and centered at the bottom. Refer to DOT 40 CFR §172.446 for label format.



25. Reuse of Containers: If impermeable containers used to transport bagged asbestos waste to the landfill are to be reused, the empty containers shall display the following label:

RESIDUE:
LAST CONTAINED ASBESTOS RQ

A. Provide cutoffs and/or temporary utilities as necessary to perform the asbestos abatement work. Coordinate all utility hook-up and cutoffs with the Owner. Use qualified tradesmen for utility cutoffs and installation of temporary service when necessary. Work shall be performed in a competent manner by qualified and appropriately trained and licensed tradesmen.
   1. Electrical Power: The Contractor shall be responsible for arranging and securing temporary electrical service from the existing infrastructure or providing for adequate onsite electrical power generation during the project duration.
   2. Ground Fault Protection: All circuits used by the Contractor shall be equipped with ground fault circuit interrupters (GFCI). The Contractor is responsible for connection to a temporary panel and routing power to his work area.
   3. Water Service: The Contractor shall be responsible for arranging and securing a temporary water source from existing infrastructure or shall provide adequate water storage and delivery mechanisms on site during the project duration.

4. Wastewater: All water used by the Contractor during asbestos abatement activities shall be collected when feasible and passed through a water filtration system capable of filtering and retaining particles larger than 5.0 microns in size prior to being discharged into the sanitary sewer.

2.5 DECONTAMINATION

A. Provide adequate facilities for the decontamination of workers. Decontamination enclosure systems shall be placed adjacent to the regulated area and shall be of sufficient size to accommodate the Contractor's personnel.

B. Provide change rooms and shower facilities that comply with 29 CFR §1910.1101. The decontamination area shall consist of an equipment room, shower area, and clean room in series.
   1. Construct a three room structure using modular systems or build using rigid plastic pipe, metal or wood framing. Interior floors, walls and ceiling shall be lined with two layers of 6 mil flame retardant plastic sheeting. Provide the following: equipment room for removal of clothing; shower room for decontamination of workers, and; clean room(change room) with lockers for worker change of clothing.
   2. The equipment room shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.
   3. Shower facilities provided shall comply with 29 CFR §1910.1101. The showers shall be adjacent both to the equipment room and the clean room. The Contractor shall ensure that workers perform proper decontamination.

C. The Contractor shall ensure that workers enter and exit the contained regulated area through the decontamination enclosure system.
   1. All workers and authorized visitors shall enter the work area through the worker decontamination enclosure system.
   2. All workers shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, Contractor(s), the project, each work area, and respiratory protection employed.
   3. In the clean room, remove and deposit street clothing within a locker provided for their use, and put on protective clothing and respiratory protection before leaving the clean room.
   4. Before entering the regulated area, the employer shall ensure that employees pass through the equipment room.
   5. Before leaving the regulated area, remove all gross contamination and debris from protective clothing.
   6. Remove protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.
   7. When exiting the work area workers shall shower and enter the clean room before changing into street clothes.

2.6 WORKER PROTECTION

A. The Contractor alone shall be responsible for the safety, efficiency, adequacy of their appliances, work methods and for any damage which may result from Contractor's improper construction, maintenance, or operation, respectively. The contractor shall erect and always maintain adequate safeguards for the protection of workmen and surrounding building occupants. The Contractor shall be responsible for

monitoring his own construction safety work practices for compliance with the applicable OSHA regulations and shall provide appropriate personnel protective equipment and training for his workers.

1. Biological/Chemical Hazards: The known hazard on site includes ACMs. Off- specification materials located in and adjacent to the structure may pose a hazard to site workers. The Contractor shall provide materials, equipment, and training to his workers to ensure their protection from this and any other chemical/biological hazards that may be identified during the Work.
2. Physical Hazards: In addition to the common physical hazards normally present on construction sites, the known physical hazards specific to this project include: heat stress; contact with active equipment, noise; and slip, trip, and fall hazards. The Contractor shall provide safety equipment and training to his workers to ensure their protection from these and any other physical hazards that may be present during the work.
3. Emergency Response: The Contractor shall establish an Emergency Response Team made up of members of their work force. The Contractor shall designate a Team Leader and organize workers who are trained to respond in the event of an accident or other emergency. Members of the Emergency Response Team shall be knowledgeable in evacuation procedures and would be the first to respond in the event of an emergency.
4. Workmen Protection: During the project period, the Contractor shall provide and maintain safety equipment as required or necessary to properly complete the work. The contractor shall provide and maintain such barricades, warning signs and devices, temporary lighting, and other safety measures necessary to properly protect workmen.

2.7 EXPERIENCE AND QUALIFICATION REQUIREMENTS

A. All phases of the work shall be executed by skilled craftsmen experienced in each respective trade. Improperly trained, untrained, or inexperienced personnel shall not be allowed in the work areas.

B. The Superintendent shall be thoroughly familiar with and experienced in asbestos removal and related work. The Site Superintendent shall have successfully completed training equivalent to the EPA Model Accreditation Plan asbestos contractor and supervision course (40 CFR Part 763, Subpart E, Appendix C). The Superintendent shall meet the requirements of a competent person set down in OSHA Standard 29 CFR §1926.1101(o). The supervisor shall be certified by Safe State Environmental Programs, Chapter 822-X-2, Accreditation of Training Programs, Training Courses, Refresher Training Courses, and Individuals Engaged in Asbestos-Related Activities.

C. All workers, who will come in direct contact with suspect ACM, shall have asbestos worker training as outlined in this paragraph. All asbestos removal workers shall be knowledgeable, qualified, and trained in the removal, handling, and disposal of asbestos material and in subsequent cleaning of the affected environment. All asbestos abatement workers shall have successfully completed training equivalent to the EPA Model Accreditation Plan asbestos worker training course (40 CFR Part 763, Subpart E, Appendix C). All workers shall be certified by Safe State Environmental Programs, Chapter 822-X-2, Accreditation of Training Programs, Training Courses, Refresher Training Courses, and Individuals Engaged in Asbestos-Related Activities.

D. All asbestos training shall be certified by the appropriate State agency.

E. The Contractor shall provide medical surveillance for all workers engaged in asbestos removal. Provide the medical examination in accordance with OSHA Standards 29 CFR§1910.134(b) and 1926.1101. The Contractor shall ensure that all employee examination results are on file in his office, are available for review, and are maintained in accordance with OSHA Standard 29 CFR §1926.1101(n)(3).

2.8 RESPIRATORY PROTECTION REQUIREMENTS

A. The Contractor shall be solely responsible for always providing adequate respiratory protection for all workers in the work area. The types of respirators used shall be approved by the National Institute for Occupational Safety and Health (NIOSH) for asbestos and in accordance with 29 CFR §1926.134.

1. Respiratory Protection Program: Where the use of respirators is required, the Contractor shall develop a written standard operating procedure to govern selection and use of respirators. As a minimum the program shall address components as required by OSHA 29 CFR §1910.134. Program components shall include: written standard operating procedures; medical surveillance; training in selection and use of respirators; proper fitting and fit testing; procedures for inspection, cleaning, maintenance and storage; requirements for surveillance of work area conditions and worker exposures; and respirator program evaluation requirements.
2. Negative Exposure Assessment: The Contractor shall produce a negative exposure assessment for each asbestos removal task to be performed. The assessment may be developed using historical air monitoring data that meets the requirements of 29 CFR§1926.1101(f)(iii) produced within the last 12 months combined with daily personnel monitoring during the work, or by providing an initial exposure assessment and daily personnel monitoring during the work.
3. Minimum Respiratory Protection: The Contractor personnel who will come in direct contact with ACM or suspect ACM shall wear approved half mask respirator equipped with HEPA filter as minimum respiratory protection.
4. Personnel Monitoring: The Contractor shall conduct exposure assessments and monitoring in accordance with 29 CFR §1926.1101(g4b). Sample analysis results shall be provided to the Owner or Owner's Representative and shall be posted within 24 hours of collection. The Contractor shall be responsible for record keeping requirements. The Owner or the Owner's Representative may collect ambient air samples and may observe the work practices to determine compliance by the Contractor.

2.9 WORKER PROTECTIVE CLOTHING AND EQUIPMENT

A. Protective clothing and equipment shall conform to OSHA requirements. The Contractor shall perform a hazards assessment and ensure personal protective equipment selected and used at the project location is adequate and appropriate for the hazards. The Contractor shall be solely responsible for enforcing personnel protection requirements.

1. Protective Clothing: Workers shall be provided with properly fitting, full - body coveralls and protective gloves, and boot - type foot covers. The Contractor shall provide the Owner and authorized representative's suitable properly fitting protective clothing, whenever they are required to enter the work area.
2. Equipment: Provide eye protection, ear protection, protective gloves, fall protection equipment, non-slip steel toe shoes, and hard hats as required for job conditions or by applicable safety regulations.

2.10 AIR MONITORING REQUIREMENTS

A. The Contractor shall be responsible for performing air monitoring as outlined below.

1. Personnel air monitoring in accordance with OSHA 29 CFR §1926.1101.
2. The air monitoring and analysis shall be performed by the Air Monitoring Specialist / firm contracted by the Contractor. The air samples shall be analyzed by PCM, NIOSH Method 7400. Air results will be made available to the UA Project Manager and the Owner's Representative within 24-hours.

B. UA Project Manager or the Owner's Representative may opt to perform air monitoring in the adjacent area during any period of the project.

PART 3 - WORK PERFORMANCE

3.1 GENERAL WORK AREA PREPARATION

A. Perform asbestos abatement in accordance with procedures outlined in §29 CFR 1926.1101 for Class I and II asbestos work.
   1. Establish a regulated area and restrict access into the work area. Provide warning signs around the perimeter of the regulated area mounted on the visual barrier, or similar approach to the work area.
   2. Shut down, disconnect, and lock out or tag all electric power to the work area so that there is no possibility of its reactivation until after clearance testing of the work area. Secure temporary power.
   3. Ensure that the Contractor's communication equipment is in place, in operating condition, and in operation during the work.
   4. Maintain emergency and fire exits from the work areas or establish alternative exits satisfactory to the local fire officials. Mark with luminescent paint on work area plastic barriers an outline of exit door(s). Affix a razor knife beside the outline. Paint words "EMERGENCY EXIT" with luminescent paint inside the door outline. Modify emergency exit door as necessary so it is secure from outside the work area but permits exiting from the work area. Exits shall be checked daily against exterior blockage or impediments to exiting.
   5. Fire Extinguisher: A minimum of one extinguisher shall be provided for every 1,500 square feet of floor area, with a maximum travel distance to an extinguisher of 75 feet. The extinguisher shall be within 5 feet of the equipment room and clean room. Place extinguishers in visible and accessible locations.
   6. Smoke Detectors: Provide one smoke detector in the decontamination enclosure clean room and one in the work area adjacent to the AFD.

3.2 GROSS REMOVAL AREA PREPARATION

A. To prepare a contained work area for gross removal asbestos abatement work, perform the following preparations in conjunction with those outlined in Section 3.1 - "General Work Area Preparation".
   1. Remove all electrical and mechanical items, such as lighting fixtures, clocks, diffusers, registers, escutcheon plates, etc. which cover any part of the surface to be worked on with the work.
   2. Remove all general construction items such as cabinets, casework, door and window trim, moldings, ceilings, trim, etc., which cover the surface of the work as required to prevent interference with the work.
   3. Movable and loose items not removed by the Owner from work areas shall be removed from work areas to a temporary location designated by the Owner or shall be disposed of as general construction debris.

3.3 PRE-REMOVAL INSPECTION

A. Prior to removal of any ACM, the Contractor shall notify the Owner and the Owner's Representative to request a pre-removal inspection. It is expected that notice will be provided within a reasonable timeframe for scheduling of the inspection. Posting of warning signs, construction of temporary partitions, plasticizing of work area, building of personnel and equipment decontamination enclosure systems, and all other preparatory steps shall have been taken prior to notification of the Owner or the Owner's Representative.

The Contractor shall not begin asbestos removal until the Owner or the Owner's Representative approves the work area preparations.

3.4 REMOVAL OF ASBESTOS-CONTAINING MATERIAL (GENERAL)

A. The Contractor shall be responsible for the proper removal of ACM from the work area using standard abatement industry removal techniques. Work will be observed by the Owner and the Owner's Representative.

B. ACM shall be wetted with amended water or removal encapsulant prior to being disturbed. Keep ACM wet during removal and disposal of these materials. Material packed in disposal containers shall be in a wet condition.

3.5 REMOVAL OF WINDOW CAULK/GLAZING

A. Window caulk may be removed by one of two methods: It can be removed by removing the entire window component or the caulk can be stripped from the mullions leaving the panes and window frames in place. Following are the possible abatement actions:
   1. Component Removal
      a. Secure any loose panes.
      b. Dismantle the window component from the building taking care to keep the unit intact.
      c. Wrap the unit in two layers of plastic, label it and place in labeled container for disposal with other asbestos waste.
   2. Caulk/Glazing Removal
      a. Prepare the work area by placing plastic on the floors and walls and outside the window to capture loose glazing.
      b. Wet the material sufficiently to minimize fiber dispersion. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions.
      c. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
      d. As material is removed, wrap it in two layers of plastic and place it in labeled containers for transportation and disposal.

3.6 MISCELLANEOUS OTHER ACM MATERIALS

A. Roofing Materials
   1. This includes bull, caulking, and Koolseal.
   2. No specialized preparations will be required for any removal of these materials.
   3. These materials shall be removed and properly bagged since the demolition will involve the roofing materials removal.

3.7 ADDITIONAL REMOVAL REQUIREMENTS

A. Daily Clean Up: Remove all loose ACM, debris, and bulk dust from the work area at the end of each work shift. In no instance shall lose ACM, debris, or bulk dust remain in the work area after completion of a work shift.

B. Stop Work Order: Stop work immediately if the work area barrier is breached in any manner. Do not resume asbestos abatement inside the work area until authorized in writing by the Owner's Representative.

3.8 STOP WORK ORDER

A. Non-Contained Work Areas: The UA Project Manager or Owner's Representative will stop the work should any visible fugitive dust emissions from the component removal process is observed. Work shall not resume until the condition(s) causing the fugitive dust emissions are corrected by the Contractor and affected areas have been cleaned.

B. Imminent Danger: The Owner or the Owner's Representative will stop the work should a condition or action creates a hazard that could be deemed as presenting imminent danger to the workers, building occupants, or public. Work shall not resume until the condition(s) causing the hazard are corrected by the Contractor and the Owner or the Owner's Representative has authorized the work resumption in writing.

3.9 WORK AREA CLEARANCE PROCEDURES

A. The Contractor shall notify the Owner's Representative for final clearance visual inspection.

B. If applicable, cleaning of the work areas prepared as "gross removal" areas shall be conducted in accordance with the four-step procedure with two cleanings of the primary barrier plastic prior to its removal and two cleanings of the room surfaces to remove any new or existing contamination.
   1. First Cleaning: Carry out a first cleaning of all surfaces of the work area including items of remaining sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping, and/or a HEPA filtered vacuum. Do not perform dry dusting or dry sweeping. Use each surface of a cleaning cloth one time only and then dispose of as contaminated waste. Continue this cleaning until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces.
   2. Remove and dispose of as asbestos- containing waste.
   3. Second Cleaning: Carry out a second cleaning of all surfaces in the work area in the same manner as the first cleaning.
   4. Removal of Primary Barriers: Immediately following the second cleaning of the primary plastic, and remove all primary barrier sheeting leaving only:
      a. Critical Barrier: Which forms the sole barrier between the Work Area and other portions of the building or the outside.
      b. Critical Barrier Sheeting: Over lighting fixtures, ventilation openings, doorways, and other openings.
   5. Third Cleaning: Carry out a third cleaning of all surfaces in the work area in the same manner as the first cleaning immediately after removal of primary barrier plastic. This cleaning is now being applied to existing room surfaces.
   6. Contractor's Inspection: At the completion of the third above cleaning, visually inspect all surfaces. Re-clean the work area if any dust or debris is found. At completion of this inspection, sweep entire work area including walls, ceilings, ledges, floors and other surfaces in the work area with exhaust from forced-air equipment (electric leaf blower or equivalent). Do not direct forced-air equipment at

any seal in any Critical Barrier. If any debris or dust is found repeat the cleaning. Continue this process until no debris dust or other material is found while sweeping of all surfaces with forced-air equipment.

7. Final Cleaning: Carry out a final cleaning of all surfaces in the work area in the same manner as the previous cleaning.
8. Contractor's Inspection: After final cleaning, perform a complete visual inspection of the entire work area including: all surfaces, ceiling, walls, floor, all plastic sheeting, seals over ventilation openings, doorways, and other openings; look for debris from any source, residue on surfaces, dust or other matter. During visual inspection sweep entire work area including walls, ceilings, ledges, floors, and other surfaces in the room with exhaust from forced air equipment (electric leaf blower or equivalent). If any debris, residue, dust or other matter is found repeat final cleaning. When the area is visually clean, and if after sweeping of all surfaces with leaf blower, no debris, residue, dust or other material is found, complete the certification at the end of this section. Visual inspection is not complete until confirmed in writing, on the certification, by the Owner's Representative.

C. When cleaning is complete the following clearances will be conducted at the site.

Material to be Abated	Clearance Required	Clearance Parameter
Non-friable material	Visual	Visual clearance of building and spot check removal methods and waste receptacles.

D. After all cleaning, inspections, and clearance requirements have been met:

1. Remove the Critical Barriers separating the Work Area from the rest of the building or the outside. Remove any small quantities of residual material found upon removal of the plastic sheeting with wet wiping and HEPA filtered vacuum cleaners. If significant quantities, as determined by the Inspector, are found, then the entire area affected shall be decontaminated.
2. Dispose of all asbestos-containing waste material as RACM.

3.10 LOAD-OUT AND DISPOSAL OF ACM

A. All ACM and resultant debris shall be considered as RACM. RACM shall be handled, packaged, transported, and disposed in accordance with OSHA Standard 29 CFR§1926.1101; DOT 49 CFR Parts 171, 172, and 173; and EPA Standard 40 CFR Part 61.

B. Packaging of RACM shall conform to OSHA Standard 29 CFR §1926.1101; DOT 49 CFR Parts 171, 172, and 173; and EPA Standard 40 CFR Part 61. RACM waste shall be placed in a wet condition into properly labeled disposal bags or containers. Waste materials shall be double-bagged or wrapped in two layers of 6 mil plastic sheeting before load-out from the work area. All air shall be evacuated from disposal bags with a HEPA filtered vacuum prior to sealing.

3.11 TRANSPORTATION AND DISPOSAL OF ASBESTOS WASTE

A. Sealed and labeled disposal bags or waste containers shall be used to transport RACM waste to the landfill. Procedures for hauling and disposal shall comply with 40 CFR Part 61, 49 CFR Part 171 and 172, and other applicable State, regional, and local government regulations.

B. The Contractor shall be responsible for the total removal and disposal of materials in an approved landfill as designated by the Alabama Department of Environmental Management (ADEM).

C. A properly completed "Waste Shipment Record" form shall accompany asbestos waste transported to a disposal site. Refer to 40 CFR Part 61 for example format of the form.

D. Provide pedestrian barricades and post with visible Danger Signs during activities involving movement of containerized asbestos waste from the work area, or when loading or unloading containerized asbestos waste. Place signed barricade in a manner that will sufficiently block passage of a pedestrian into a waste handling area. Barricade Danger Sign legend, text size, style and arrangement shall conform to the requirements of EPA Standard 40 CFR §61.149(d)(1).

E. Only sealed disposal containers are permitted to be deposited in landfill. Workers shall place asbestos waste in the landfill. Throwing or dumping of containers shall not be allowed. Workers unloading and handling the sealed bags/drums at the disposal site shall wear appropriate personal protective equipment including respirators and protective clothing.

PART 4 - CERTIFICATE OF WORKER'S ACKNOWLEDGMENT ASBESTOS ABATEMENT WORKERS

PROJECT NAME: UA McLure Library Addition and Renovation

CONTRACT NUMBER: 051-23-2688D/91209

NAME OF COMPANY: _____

NAME OF EMPLOYEE: _____ SSN (last 4 digits): _____

I ACKNOWLEDGE AND UNDERSTAND THAT WORKING WITH ASBESTOS CAN BE DANGEROUS. INHALING ASBESTOS FIBERS HAVE BEEN LINKED WITH TYPES OF LUNG DISEASE AND CANCER. I UNDERSTAND THAT IF I SMOKE AND INHALE ASBESTOS FIBERS THE CHANCE OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NON-SMOKING PUBLIC.

Your employer's contract for the above project requires that: you be provided with and complete formal and project specific training, you be supplied with proper personal protective equipment and applicable training in its use, and that you receive a medical examination to evaluate your physical capacity to perform your assigned work tasks if you wear a respirator or your exposure to airborne asbestos fibers is greater that the OSHA permissible exposure limit (PEL). These things are to be done at no cost to you. By signing this certification, you are acknowledging that your employer has met these obligations to you.
FILL IN BELOW THOSE ITEMS THAT ARE APPLICABLE TO THE EMPLOYEE.

NOTE: EMPLOYER WILL BE REQUIRED TO PROVIDE VERIFICATION OF TRAINING.

INITIAL TRAINING: I have completed an asbestos abatement training course for Workers; Contractor / Supervisor / Class III (circle one) that meets EPA and the State of Alabama's requirements.

Date Completed: _____

REFRESHER TRAINING: I have completed annual refresher on the above asbestos training courses.

Date Completed: _____

MEDICAL EXAMINATION: I have had a medical examination within the last twelve months which was paid for by my employer. I was personally provided a copy and informed of the results of that examination. Check one below.

A physician determined (there were _____) (there were no _____) limitations to performing asbestos related work.

Date medical exam was performed: _____

Employee Signature: _____ Date: _____

Printed Name: _____

Contractor's Competent Person or Industrial Hygienist

Signature: _____ Date: _____

Printed Name: _____

PART 5 - RESPIRATORY PROTECTION JUSTIFICATION FORM

PROJECT NAME: UA McLure Library Addition and Renovation

LOCATION: University of Alabama – Tuscaloosa, AL

DATE OF SUBMITTAL: _____

DATE(S) HISTORIC MONITORING DATA WAS COLLECTED: _____

Based upon airborne asbestos fiber counts encountered on previous projects of a similar type under work place conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations, the following level of respiratory protection is proposed for the indicated operations to maintain an airborne fiber concentration below 0.005 fibers per cubic centimeter (f/cc) exposure limit inside the respirator facepiece of the abatement worker.

Operation	Anticipated F/CC	Respiratory Protection	Protection Factor	F/CC in Mask
Work Area Preparation				
Removal of friable ACM				
Removal of Non-friable ACM				
Removal of roofing ACM				
Cleanup of ACM and debris				
Disposal of waste material at landfill				
Other (describe):				

The Contractor certifies that to the best of his knowledge and belief the above represent a true and accurate representation of airborne fiber concentrations expected for the operations indicated and are based upon airborne fiber data from projects with similar materials and operations performed within the past one-year period. If requested by the Owner, the Contractor shall provide backup documentation for verification of the above data.

CHECK ONE:

_____ Data will serve as Negative Exposure Assessment

_____ Data will serve as historic data only

Contractor: _____

Signature: _____ Date: _____

Abatement Pre-Work Submittals Checklist and Review

Project Name: UA McLure Library Addition and Renovation Client: University of Alabama Project #: 051-23-2688D/91209

Reviewer: _____ Date Received: _____ Date Reviewed: _____

Included	Description	Accepted	Revise & Resubmit	Reviewer Comments
	A. **Health and Safety Plan:** Written Health and Safety Plan addressing procedures for workplace safety. Address how physical and health hazards associated with the work are identified and communicated to employees, and the name of the person responsible for implementation of the Health and Safety Plan. Address procedures for using scaffolds, hoists and ladders safely, electrical safety procedures, and guidelines for protection from noise, heat stress, chemical exposure, and trip/fall hazards. Also address confined space entry procedures to address specific hazards posed by tunnel and attic work. Confined space procedures should conform to 29 CFR 1926 Subpart AA.			
	B. **Contingency Plan:** Written Emergency Action Plan outlining the actions to be performed for emergencies including fire, accident, or unexpected asbestos contamination in the adjacent site area and on the adjoining grounds. This Plan shall identify the way emergencies are announced, emergency procedures and persons responsible for rescue, medical duties, and fire prevention.			
	C. **Work Plan:** Provide a work plan indicating the sequencing of the removal activities, description of the abatement area containment methods, description of the work methods and removal procedures to be used, description of the waste handling and preparation for disposal, location of work area entrance and egress points, location of decontamination unit(s), location of AFDs, methods and locations of waste containment, conveyance, and collection devices (i.e. roll-offs) and drawings showing the regulated area.			
	D. **Progress Schedule:** Schedule showing the order in which the Contractor proposes to carry out the work, the date he will start work, and the projected date of completion for each work area, as necessary. The Contractor shall provide the specific hours the Contractor intends to work onsite, and the number of personnel to work each shift.			
	E. **Notifications:** Proof of written pre-work notification submitted to agencies requiring notification under Paragraph "Agency Notifications".			

Abatement Pre-Work Submittals Checklist and Review

	F. **Contractor's License:** Copies of licenses specific to construction/demolition and asbestos abatement for the state in which work is to be performed.			
	G. **Respirator Program:** Written respiratory protection program as required by OSHA regulations. Respirator fit test verification required for asbestos abatement workers.			
	H. **Employee Information:** The contractor should provide the following information for each employee assigned to perform asbestos abatement work at this jobsite. The information should be arranged by employee.			
	1) **Training Certificates:** Copies of all supervisors' and workers' training certificates and any annual re-accreditation records which demonstrate receipt of EPA-approved or OSHA mandated training courses required to perform asbestos-related work.			
	2) **Proof of Accreditation:** Copies of State accreditation (may be a certificate or copy of card).			
	3) **Physician Statement:** Copies of current (within the preceding 12 months) physician statements for each employee assigned to perform asbestos abatement work for this project and to perform work under respirator protection stating that employee can work in a respirator. To comply with HIPAA, no medical information should be included. The form should only include a statement from the physician that the employee has been examined and determined fit for the tasks required for this scope of work.			
	4) **Fit Test:** Copy of proof of fit testing (must not be older than 12 months).			
	5) **Certificate of Worker's Acknowledgment:** Provide completed Worker's Acknowledgment for each employee to work onsite (see Section 4 of this Specification for example form).			
	I. **Product Information:** Provide a complete product list including name of material and the manufacturer's name for all materials to be brought to the site. Provide a Safety Data Sheet (SDS) for materials, if applicable. Provide additional information if requested.			
	J. **Waste Handling and Disposal:** Written procedures for waste load-out, temporary storage, transportation, and location of disposal site.			
	K. **Respiratory Protection Justification:** Provide completed Respiratory Protection Justification prior to beginning work (see Section 5 of this Specification for example form).			

Abatement Pre-Work Submittals Checklist and Review

	L. **Monitoring Subcontractor:** Provide company information along with credentials for the 3rd Party Subcontractor managing the sampling and testing for all personnel, area, and clearance events.			

Notes:

1. Organize the submittal documents in the order provided above for ease of review. Section each submittal with a cover sheet and the name of the section.
2. Organize each employee information submittal by employee name for each certificate or acknowledgement requested. Indicate which employee(s) will act as supervisor for the crew.
3. Any item noted as "Revise and Resubmit" only that item will have to be resubmitted for follow-up review.
4. Provide coversheet for submittal with the following information: Project Name, Client, Project Number; Date Submitted; Contractor Name; Contractor Contact, Contact Information (phone, email).

	A	B	C	D	E	F	G	H	I	J
1	**Room #**	**Rm Desc/Use**	**Fl Tile**	**U/C**	**Mastic**	**Carpet Only**	**Walls**	**Ceiling**	**Ceiling Tile**	**NOTES**
2	**Basement**									
3	11	Library	Pos	No	Pos		Neg	Pos	No	
4	12	Janitor	No	No	No		Neg	Neg	No	
5	13	Library/Study room	Pos	No	Pos		Neg	Neg	Neg	Ceiling tile nailed on grid
6	13A	Storage	No	No	No		Neg	Neg	No	
7	14	Office	Pos	No	Pos		Neg	Pos	No	
8	15	Mechanical	Pos	No	Pos		Neg	Pos	No	
9	15A	Janitor	Pos	No	Pos		Neg	Neg	No	
10	16	Proccessing room	Pos	No	Pos		Neg	Neg	No	
11	17	Men	Pos	No	Pos		Neg	Neg	No	
12	18	Women	Pos	No	Pos		Neg	Pos	No	
13	18A	Janitor Supply	No	No	No		Neg	Neg	No	
14	24A	Library	Pos	No	Pos		Neg	Neg	No	
15	C001	Stair South	Neg	No	Pos		Neg	Neg	No	
16	C002	Vestibule	Pos	No	Pos		Neg	Neg	No	
17	C003	Stair NW	Pos	No	Pos		Neg	Neg	No	Fl tile on landing
18	C004	Stair East	Pos	No	Pos		Neg	Neg	No	
19	C005	Stair NE	No	No	No		Neg	Neg	No	
20	C006	Elevator	Pos	No	Pos		Neg	Neg	No	Door insulation-Positive
21		Exterior Mech Rm	No	No	No		Neg	Neg	No	Asbestos pipe ins. NE corner
22										
23	**1st Floor**									Ceiling tile glue-Pos rm 20, 21
24	20	Study Area	Pos	No	Pos		Pos	Neg	Neg	Wall plaster POS above chairrail
25	21	Proccessing room	Pos	Yes	Pos		Pos	Neg	Neg	Wall plaster POS above chairrail
26	22	Office	Pos	Yes	Pos		Neg	Neg	No	
27	23	Office	Pos	Yes	Pos		Neg	Neg	No	
28	24B	Library	Pos	No	Pos		Neg	Neg	No	
29	25	Janitor	Pos	No	Pos		Neg	Neg	No	
30	C101	Stair South	No	No	No		Neg	Neg	No	
31	C103	Stair NW	No	No	No		Neg	Neg	No	
32	C104	Stair East	No	No	No		Neg	Neg	No	
33	C105	Stair NE	No	No	No		Neg	Neg	No	
34										
35	**1st Floor Mezzanine**									

	A	B	C	D	E	F	G	H	I	J
1	**Room #**	**Rm Desc/Use**	**Fl Tile**	**U/C**	**Mastic**	**Carpet Only**	**Walls**	**Ceiling**	**Ceiling Tile**	**NOTES**
36	MO24C	Library	Pos	No	Pos		Neg	Neg	No	
37	MC105	Stair	No	No	No		Neg	Neg	No	
38										
39	**2nd Floor**									
40	24D	Library	Pos	No	Pos		Neg	Neg	No	
41	30	Office	Pos	Yes	Pos		Neg	Neg	No	
42	31	Office	Pos	Yes	Pos		Neg	Neg	No	
43	32	Office	Pos	Yes	Pos		Neg	Neg	No	
44	33	Computer Lab	No	No	Pos		Neg	Neg	No	ceiling texture-Neg
45	33A	Janitor	Pos	No	Pos		Neg	Neg	No	Room # 37 on door
46	34	Womens	?	No	?		Neg	Neg	Neg	? asb fl tile Under ceramic
47	34A	Men	?	No	?		Neg	Neg	Neg	? asb fl tile Under ceramic
48	35	Break room	Pos	Yes	Pos		Neg	Neg	Neg	Ceiling tile glue-Pos
49	36	Study room	Pos	No	Pos		Neg	Neg	No	ceiling texture-Neg
50	C201	Stair South	No	No	No		Neg	Neg	No	Ceiling texture Above CT-Neg
51	C202	Corridor	Pos	No	Pos		Neg	Neg	No	
52	C203	Corridor	Pos	No	Pos		Neg	Neg	No	
53	C204	Stair East	Pos	No	Pos		Neg	Neg	No	Fl tile on landing
54	C205	Stair NE	No	No	No		Neg	Neg	No	
55										
56	**2nd Floor Mezzanine**									
57	MO24E	Library	Pos	No	Pos		Neg	Neg	No	
58	MC205	Stair NE	No	No	No		Neg	Neg	No	
59										
60										
61	1. Window glazing-Positive									
62	2. Elevator door insulation-Positive									
63	3. Ceiling texture above suspended ceiling 3rd floor stairwell landing-Negative									
64	4. Asbestos mat on floor of south end of room 13A.									
65	5. Rooms 34 and 34A may have asbestos floor tile or mastic under the ceramic floor tile.									
66	6. Asbestos pipe insulation in exterior mechanical room.									
67	7. Potential for there to be asbestos pipe insulation in inaccessible areas such as walls, ceilings, floors, crawlspace, etc.									
68	8. All 1x1 ceiling tile glue positive, rooms 20, 21, 35.									
69										

	A	B	C	D	E	F	G	H	I	J
1	**Room #**	**Rm Desc/Use**	**Fl Tile**	**U/C**	**Mastic**	**Carpet Only**	**Walls**	**Ceiling**	**Ceiling Tile**	**NOTES**
70										
71	Key: Fl tile-is floor tile present yes or no, if present positive or negative									
72	Key: U/C is floor tile present under the carpet yes or no									
73	Key: Mastic-is floor tile mastic present yes or no, if present positive or negative									
74	Key: Carpet Only-No floor tile or old mastic that is positive									

Note: During follow up evaluations conducted during the second half of 2023, UA EHS has noted that the metallic black roofing bull on the exterior roof is positive. This includes exterior roofing, parapet wall, roof penetrations, and roof flashings.

SECTION 02 21 02

EXISTING UTILITIES

PART 1 - GENERAL

1.1 EXISTING UTILITIES

A. The Contractor shall be responsible for the protection of all existing utilities. Where existing utilities are interrupted, damaged, or taken offline for connection to other facilities, or are taken out of service for any reason associated with the work, the Contractor shall work expeditiously and non-stop thru meals, breaks, after hours, thru weekends, holidays, etc. to return the utility to service as soon as possible. Where the Contractor plans to remove existing utilities from service with the prior expressed approval of the utility and the Owner, the Contractor shall coordinate with persons, businesses, or parties that may be affected by the temporary loss of service.

   i. If shown in the drawings, the Contractor shall install all conduits, equipment pads, pedestals, etc., for each private utility company. The installation and materials shall be approved and to the satisfaction of each private utility company representative before the underground conduit system shall be turned over to each private utility company to install below ground utilities. The Contractor shall not relinquish ownership of the conduit system until all below ground utilities are pulled/installed and the systems are energized/activated, allowing the retirement of above ground utilities.

   ii. All coordination with private utility companies is the sole responsibility of the Contractor. Proper scheduling of private utility company crews to install new services and retire existing services shall rest on the Contractor's timely, advance coordination of the overall project schedule with each private utility company. There shall be no additional contract time granted for the Contractor's failure to coordinate in a timely fashion with the private utility companies.

B. Any adjustments (temporary or otherwise), protection, support, removal, relocation, or repairs, etc. to utilities shall be performed by the utility (at the expense of the Contractor). Alternatively, if the utility owner desires, such activity shall be performed by the Contractor at his expense in a manner meeting the approval of the utility.

C. Verification of Existing Utilities - Prior to any excavation, the Contractor shall be responsible for unearthing all known utilities to confirm the location and depth of such utility(s) sufficiently far enough in advance to allow for any necessary adjustment(s) of the vertical or horizontal alignment of any proposed new utility or structure, if necessary. If any such conflict(s) are discovered, all information shall be provided to the Owner’s Representative in order to allow proper time for any necessary design adjustments.

END OF SECTION 022102

SECTION 02 41 16

SITE DEMOLITION

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the following:

i. Demolition and removal of existing site structures such as but not necessarily limited to light poles and bases, storm / sanitary structures, concrete and asphalt pavement, curbs, gutters, sidewalks, walls, brick columns, fencing, etc.

ii. Disconnection, capping / sealing, and removing existing site utilities.

iii. Disconnection, capping / sealing, and abandoning existing site utilities in place. This shall include grout filing the abandoned utilities entirely in place with low strength grout.

1.2 DEFINITIONS

A. Remove: Items to be removed and legally disposed of by the Contractor except any such item(s) designated to be reinstalled or reused, salvaged, or to remain property of the Owner.

B. Remove and Salvage: Items indicated to be removed and salvaged by the contractor but to remain as property of the Owner. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers. Load, transport, unload, and place in area as designated by the Owner.

C. Remove and Reinstall: Items designated to be removed and re-used and / or reinstalled by the Contractor. This shall include any and all cleaning, servicing, preparation of any such items for reuse, along with any temporary storage or protection against damage.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the Owner and at the discretion and cost of the Contractor, items may be removed to a suitable, protected storage location during demolition and then cleaned and reinstalled in their original locations.

1.3 OWNERSHIP OF MATERIALS

A. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

B. Historical items, relics, and similar objects including, but not necessarily limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be discovered and / or encountered during demolition or construction shall remain the Owner's property if deemed so by the Owner. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner. Cooperate with Owner's archaeologist or historical adviser prior to removal and manner in which item(s) are to be removed, transported, placed in Owner’s possession by the Contractor.

1.4 SUBMITTALS

A. Schedule and sequence of demolition activities indicating as a minimum the following:

i. Detailed sequence, complete with start and end dates and times.

ii. Indicate notification dates to the Owner and /or utility owners.

iii. Dates, times, and duration of utility service disruptions.

B. Proposed dust and noise control measures.

C. List of times to be removed, salvaged, retained by the Owner.

D. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition and construction operations.

E. Location (GPS coordinates), vertical elevation, type, size, etc. of capped utilities, either abandoned or remaining in service.

F. Landfill records for hazardous waste disposal. Documentation shall include receipt and acceptance of such material. Landfill facility shall be properly licensed to accept such hazardous waste, with proof to be included with submitted documentation.

1.5 QUALITY ASSURANCE / CONTROL

A. Comply with any and all governing State, Local, EPA notification regulations or requirements prior to beginning any demolition. Hauling and disposal regulations of authorities having jurisdiction shall also be followed.

B. Qualifications: Engage experienced personnel that have successfully completed demolition work similar in nature to this Project.

C. Pre-demolition Conference shall be scheduled simultaneously with the owner and any impacted utility owner(s) on-site a minimum of forty-eight (48) hours prior to beginning any demolition.

1.6 PROJECT CONDITIONS AND SCHEDULING

A. Evaluation of the demolition items and determination if asbestos is present shall be coordinated by the Contractor with the Owner. The Owner, or a representative of the Owner will examine and make the determination if asbestos or other hazardous material(s) exists. Should asbestos be present, it will be the Contractor's responsibility to secure pricing from a properly licensed company to perform removal and disposal of such asbestos material. It shall be the Contractor's responsibility to coordinate removal of all material. The cost of all associated work with the removal, transporting, disposal, etc. shall be the responsibility of the contractor. The Contractor shall submit to the Owner's Representative a certified letter stating that all asbestos has been removed and provide tickets for the disposal location.

B. Sale or storage of items or materials to remain the property of the Contractor once removed and salvaged by the Contractor shall be immediately removed from the project site. No on-site storage of such items or materials shall be permitted.

C. Demolition, removal, and salvage operations schedule shall not interfere with the day to day use of the

site or the surrounding areas by the Owner. All elements associated with such work shall be performed in such a manner to not disturb on-going activities of the Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 EXISTING CONDITIONS

A. Contractor shall be responsible for verifying all utilities have been property located and disconnected in areas of required demolition.

B. Contractor shall confirm the existing conditions and any necessary requirements associated with any utility outages necessary for completion of the demolition.

C. Contractor shall conduct field observations and document the condition of items designated to be demolished, salvaged, and / or re-used.

D. Contractor shall identify any potential hazards associated with the demolition activities.

3.2 UTILITIES

A. Contractor shall be responsible for the location of all existing utilities prior to beginning demolition work.

B. Disconnection and shutdown of existing utility services shall be coordinated by the contractor without the appropriate utility company and the Owner. No services shall be turned off without prior coordination, communication, and approval from the utility company(s) and Owner.

C. All utilities indicated to be removed shall be excavated and removed, as necessary. Any trench backfill shall follow the trench backfill requirements as specified in other sections of these specifications.

D. All existing utilities indicated to be abandoned in-place shall be completely filled with a low strength grout material with a liquidity as required so that all voids are filled in the abandoned utility. All existing chemicals, gases, flammables, or other dangerous materials, along with any liquids, solids, etc. shall be completely drained, purged, otherwise removed, collected, and properly disposed of before proceeding with abandoning, grout filling, or removal of such abandoned utility.

3.3 PREPARATION FOR DEMOLITION ACTIVITIES

A. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

B. Demolition operations shall be conducted in such a manner to prevent injury to pedestrians along with damage to adjacent buildings, streets, utilities, and facilities to remain. A safe and protected passage for pedestrians around the demolition area(s) shall be provided by the contractor. As a minimum, the following shall be provided:

i. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways where required by authorities having jurisdiction.

ii. Protect existing site improvements, appurtenances, and landscaping to remain.

iii. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

C. Shoring, bracing, supports, etc.: Provide and maintain any shoring, bracing, structural support, etc. as necessary to preserve the stability and prevent movement, settlement, or collapse of existing retaining walls, buildings, utilities, etc. in the area of the demolition. Any additional measures required after the initial supports have been installed will be required as deemed necessary by the Contractor, the Owner's representative(s), and / or the Owner.

D. Explosives: Use of any explosives shall not be allowed without written consent from the Owner and any authorities having jurisdiction. Consent from the owner or jurisdictional entities shall not in any way relieve the Contractor of all responsibility and liability to injuries or other damages to property due to the use of such explosives. The contractor shall be responsible for any and all pre-blasting observations, reports, documentation, etc.

E. Pollution Controls: Water mist, temporary enclosures or covers, or any other means, methods, techniques to limit the spread of dust, dirt, or debris shall be the responsibility of the Contractor.

i. Hazardous conditions such as ice, flooding, and pollution when using water shall be avoided or mitigated.

ii. Remove and haul debris in such a manner that spillage onto existing surfaces shall be prevented.

iii. Any dust, debris, dirt, etc. caused by the demolition process on existing buildings, streets, structures, vehicles, etc. shall be immediately cleaned by any and all means necessary as directed by the Owner at the sole expense of the Contractor.

3.4 DEMOLITION

A. Demolition of any items below the proposed subgrade shall be as follows:

i. Any foundation wall, footings, supports, etc. shall be removed a minimum of eighteen (18) inches below the proposed subgrade.

ii. Concrete or asphalt surface may be broken up into particle sizes as indicated in Section 31 2000, Earth Moving, for areas below the subgrade. Otherwise, all should be removed from the project area.

iii. Any items of old debris such as trolley rails and / or ties, tanks, vaults, etc. shall be completely removed unless written consent that such items may remain is provided by the Owner. Cost of any such removal shall be the sole responsibility of the Contractor.

iv. All earthen fill resulting from the demolition process shall follow Section 31 2000, Earth Moving.

B. Demolition Material Disposal

i. All material and debris removed from the project shall be disposed of off-site at a location of the Contractor's discretion. Disposal shall follow any and all local, State, or Federal requirements.

ii. No dumping of material on adjacent property(s) or burial of such material shall be allowed.

iii. Burning of perishable debris or material on-site will not be allowed unless written consent is provided by the Owner. If written consent for such burning is provided by the Owner, the contractor shall still remain responsible and liable for all pollution and environmental control of such burning activities.

END OF SECTION 024116

SECTION 03 15 20

UNDER-SLAB VAPOR BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Under-slab vapor barrier, seam tape, mastic, pipe boots and detail strips for installation under concrete slabs.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM E 1745-09: Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
2. ASTM E 154-08a: Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
3. ASTM E 96-05: Standard Test Methods for Water Vapor Transmission of Materials.
4. ASTM E 1643-10: Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
5. ASTM F1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

B. American Concrete Institute (ACI):
1. ACI 302.2R-06: Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

1.3 ACTION SUBMITTALS

A. Product data.

B. Samples.

C. Installation instructions for placement, seaming and pipe boot installation.

1.4 INFORMATIONAL SUBMITTALS

A. Independent laboratory test results showing compliance with ASTM & ACI Standards.

B. Summary of test results per paragraph 8.3 of ASTM E 1745-09.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer's instructions.

C. Stack membrane on smooth ground or wood platform to eliminate warping.

D. Protect materials during handling and application to prevent damage or contamination.

E. Ensure membrane is stamped with manufacturer's name, product name and membrane thickness.

1.6 QUALITY ASSURANCE

A. Field Inspection: Manufacturer's Representative shall inspect and approve completed vapor barrier installation prior to pouring concrete slab.
   1. Contractor shall notify manufacturer's representative at least two week prior to completion of installation to schedule inspection.
   2. Manufacturer's Representative shall furnish Architect with written report of observations and recommendations.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Installed vapor barrier shall not be exposed to the elements for more than 30 days.

B. Do not apply on frozen ground.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Products/Manufacturers:
   1. **"Stego Wrap Vapor Barrier (15 mil)"** by STEGO INDUSTRIES LLC.
   2. **"Perminator 15 mil"** by W.R. Meadows, Inc.
   3. **"VAPORguard"** by REEF INDUSTRIES.
   4. **"Moistop Ultra 15"** by FORTIFIBER.
   5. **"Vapor Block VB15"** by RAVEN INDUSTRIES, INC.
   6. **"Viper II - Class A, 15 mil"** by INSULATION SOLUTIONS, INC.
   7. **"Xtreme Vapor Barrier 15 mil"** by TEX-TRUDE, INC.

2.2 MATERIALS

A. Vapor Barrier: Vapor Barrier membrane shall have the following minimum properties:
   1. Permeance: Permeance of less than 0.01 Perms (grains/ft^2 hr inHg) as tested in accordance with ASTM E 1745-09.
   2. Strength: ASTM E 1745-09 Class A.
   3. Thickness: 15 mils minimum.

2.3 ACCESSORIES

A. Seam Tape: Manufacturer's standard High Density Polyethylene Tape with pressure sensitive adhesive, minimum 4 inches wide having the following properties:
   1. Water Vapor Transmission Rate: ASTM E-96, 0.3 perms or lower.

B. Mastic: Manufacturer's standard vapor proof mastic having the following properties:
   1. Water Vapor Transmission Rate: ASTM E-96, 0.3 perms or lower.

C. Pipe and Penetration Boots: Construct pipe boots from vapor barrier material, pressure sensitive tape, and mastic per manufacturer's instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that subsoil is approved by Architect or Engineer.
   1. Level, tamp or roll aggregate, sand or earth base.

3.2 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.

B. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.

C. Lap vapor barrier over footings and seal to foundation walls.

D. Overlap joints 6 inches and seal with manufacturer's tape.

E. Seal all penetrations (including pipes) with pipe boots constructed from vapor barrier material, pressure sensitive tape, and mastic per manufacturer's instructions.
   1. Install continuous, vapor-tight mastic seal around penetrations before sealing with tape.

F. Seal underslab vapor barrier against perimeter sheet waterproofing to maintain integrity of vapor seal.

3.3 PROTECTION

A. Protect vapor barriers from penetrations other than reinforcing steel and permanent utilities.

B. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches, and taping all four sides with tape.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Work of this section includes cast-in-place concrete, formwork, reinforcing, mix design, placement procedures, and finishes as shown on the drawings, specified herein or required to complete the work of this section.

B. Architectural and Structural Precast concrete is specified in other Division 3 Sections.

C. Mechanical finishes and concrete floor toppings are specified in other Division 3 Sections.

1.03 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect, or Engineer.

C. Shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with the latest edition of ACI SP-66, “ACI Detailing Manual,” showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

D. Mix designs as specified in herein.

E. Samples of materials as requested by Architect, or Engineer including names, sources, and descriptions. Following are possible samples, however, requests will not be limited to this list.

1. Normal weight aggregates.
2. Fibrous reinforcement.
3. Reglets.
4. Waterstops.
5. Vapor retarder.

F. Laboratory test reports for concrete materials and mix design tests.

G. Material certificates in lieu of material laboratory test reports when permitted by the Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.04 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. ACI 301, “Specification for Structural Concrete for Buildings”.
2. ACI 302.1R, “Guide for Concrete Floor and Slab Construction”.
3. ACI 304, “Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete”.
4. ACI 305, “Hot Weather Concreting”.
5. ACI 306, “Cold Weather Concreting”.
6. ACI 318, “Building Code Requirements for Structural Concrete”.
7. Concrete Reinforcing Steel Institute (CRSI), “Manual of Standard Practice”.

B. Concrete Testing Service: The construction manager shall engage a testing laboratory to perform material evaluation tests including floor slab flatness testing. Refer to Division 1 Specification Sections.

C. Materials and installed work which do not conform to specified requirements shall be corrected/replaced at Contractor’s expense.

D. Pre-construction Conference: Prior to submittal of design mixes, conduct a meeting to review detailed requirements for preparing concrete design mixes and to determine procedures for satisfactory concrete operations. Review requirements for submittals, status of coordinating work, and availability of materials. Establish preliminary work progress schedule and procedures for materials inspection, testing, and certifications. Request that representatives of each entity directly concerned with cast-in-place concrete attend the conference, including, but not limited to, the following:

1. Construction manager’s superintendent.
2. Laboratory responsible for concrete design mixes.
3. Laboratory responsible for field quality control.
4. Ready-mix concrete producer.
5. Concrete contractor.
6. Structural engineer.
7. Admixture and sealer / topping manufacturer.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joists and to conform to joint system shown on drawings.

1. Use overlaid plywood conforming with US Product Standard PS-1 “A-C or B-B High Density overlaid Concrete Form,” Class I.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, Isolation Joints, and Supports: metal, fiberglass-reinforced plastic, paper or fiber tubes. Provide paper or fiber tubes of laminated plies with water-resistant adhesive and wax-impregnated exterior for weather and moisture protection. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.

D. Form Release Agent: Provide commercial formulation form-coating compounds with a maximum VOC of 350 g/l, that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spilling concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to exposed surface.

2.02 REINFORCING MATERIALS

A. Refer to drawings for types of reinforcing required.

B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

C. Steel Wire: ASTM A 82, plain, cold-drawn steel.

D. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

E. Deformed Steel Welded Wire Fabric: ASTM A 497.

F. Joint Dowel Bars: ASTM A 615, grade 60, plain steel bars.

G. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire-bar type supports complying with CRSI specifications.

1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2)
2. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs. Welded wire fabric may be supported on bricks.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type 1.

1. Use one brand of cement throughout project unless otherwise acceptable to Engineer.

B. Fly Ash (where permitted): ASTM C 618, Type F or Type C.

C. Normal Weight Aggregates: ASTM C 33 and as herein specified. Provide aggregates from a single source for exposed concrete.

1. For exterior exposed surfaces, do not use fine or coarse aggregates containing substances that cause spalling.

2. Coarse aggregate for slab-on-grade, pavement and sidewalks shall be crushed limestone.

D. Lightweight Aggregates: ASTM C 330.

E. Water: Potable and free of substances detrimental to concrete or reinforcement.

F. Admixtures, General:

1. Provide admixtures for concrete that contain not more than 0.05 percent chloride ions. Calcium chloride and thyocyanates are not permitted.
2. Admixtures shall be used at the discretion of the contractor and approved by the Structural Engineer.

G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with all other required admixtures.

H. Water-Reducing Admixture: ASTM C 494, Type A.

I. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G.

J. Water-Reducing, Accelerating Admixture: ASTM C 494, Type C or Type E.

K. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

2.04 RELATED MATERIALS

A. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.

B. Sub Base: #57 or CA-6 crushed stone, when compacted, that provides a smooth and even surface below slabs-on-grade. Compact to 95 percent (95%) standard proctor density with a moisture content at ±3% of optimum or as required by the geotechnical engineering report.

C. Vapor Retarder: Provide vapor retarder over prepared base material where indicated below slabs-on-grade. Use only materials that are resistant to deterioration when tested in accordance with ASTM E 154, as follows:

1. Polyethylene sheet not less than 10 mils thick.

D. Curing, sealing and hardening compound for interior warehouse slabs:

1. Ashford Formula or approved equal.

E. Curing and anti-spalling compound for exterior concrete and interior office floor slabs shall be the following product or an approved equal:

1. Pliocure, Euclid Company.
2. Kure-N-Seal, Sonneborn Building Products.

F. Grout mix for pre-cast concrete panel bases (where required):

1. Cement: 6 bags (564 lbs.)
2. Sand: 2900 lbs.
3. Water: 42 gallons.

    a. Maximum slump: 6 inches.

G. Perimeter Insulation: Rigid extruded polystyrene cellular thermal board 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, Type IV. Maximum flame spread and smoke developed values of 5 and 175 respectively.

1. Provide one of the following:
    a. "SM" by the Dow Chemical Company.
    b. "Formular 250" by UC Industries, Inc.

2.05 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is chosen, use an independent testing facility acceptable to Structural Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless acceptable to Engineer.

1. Limit use of fly ash (where permitted) to less than 25 percent (25%) of portland cement content by weight.
2. Fly ash shall not be used in concrete for interior or exterior slab-on-grade construction (except as noted).

B. Submit written reports to Construction Manager and Engineer of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until proposed mix designs have been reviewed.

C. Design mixes to provide concrete with the properties indicated on the drawings and herein specified.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.

E. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps and sloping surfaces: 4 inches at point of placement.
2. Concrete containing HRWR admixture (Superplasticizer): Not more than 7 inches after addition of HRWR to verified 2-inch to 3-inch slump concrete.
3. Concrete for flat work as noted above.
4. Other concrete: 4 inches, $\pm$ 1 inch at point of placement.

2.06 ADMIXTURES

A. General: All admixtures shall be used in compliance with manufacturers recommendations. All admixtures are subject to review by the Engineer.

B. Use water-reducing admixture or high-range water-reducing admixture (Superplasticizer) in concrete as required for placement and workability (where allowed) subject to approval by the Structural Engineer.

C. Use admixtures in concrete as recommended by manufacturer for climatic conditions prevailing at time of placement.

D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content as specified in the drawings and as noted in Section 2.5.

E. Use high-range water-reducing admixture in pumped concrete and concrete with w/c ratio below .43, and as required for workability, subject to approval by the Engineer.

2.07 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as specified.

1. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce mixing and delivery time from 1-1/2 hours to 60 minutes. When air temperature is above 90°F (32°C), reduce mixing and delivery time to 45 minutes.

PART 3 - EXECUTION

3.01 GENERAL

A. Coordinate the installation of joint materials, vapor retarder and other required or related materials with the placement of forms and reinforcement.

3.02 FORMS

A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with ACI 347.

B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.

D. Provide temporary openings for cleanouts and inspection where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Re-tighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.

3.03 VAPOR RETARDER INSTALLATION

A. General: Following the leveling and tamping of granular base for slabs-on-grade, place vapor retarder sheeting with longest dimension parallel with direction of pour.

B. Lap joints 6 inches and seal with manufacturer's recommended mastic and pressure-sensitive tape.

3.04 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details, methods of reinforcement placement, supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as approved by the Structural Engineer.

D. Place reinforcement to maintain at minimum coverage for concrete protection per ACI or as indicated on the construction documents. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire fabric in flat sheets and in as long lengths as practical. Lap adjoining pieces as specified by ACI. Offset laps of adjoining widths to prevent continuous laps in either direction.

1. Use of concrete bricks to support welded wire fabric is acceptable.

3.05 JOINTS

A. Construction Joints: Locate and install construction joints as indicated or, if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to the Structural Engineer. Refer to details on construction documents.

B. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

C. Contraction Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown using a soff-cut saw. Use saw cuts approximately 1/8 inch wide. Joint depth should be as recommended by the soff-cut saw manufacturer. Joints should be cut in slab before concrete reaches a compressive strength of 500 psi, but without dislodging aggregate or otherwise damaging the concrete.

1. Joint filler and sealant (when required) material is specified in Division 7 Sections of these specifications.

3.06 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

B. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to obtain required elevations and contours in finished surfaces.

3.07 PREPARATION OF FORM SURFACES

A. General: Coat contact surfaces of forms with the specified form release agent before reinforcement is placed.

B. Do not allow excess form-coating materials to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

C. Coat steel forms with a nonstaining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.08 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to

time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is completed.

1. Use of laser screeds for slabs-on-grade is mandatory.
2. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement, embedded items, and into corners.
3. Use highway straight-edge to smooth and straighten the surface. Do not disturb slab surfaces prior to beginning finishing operations.
4. Maintain reinforcing in proper position during concrete placement.
5. Slabs on Metal Deck: Compensate for deflection of deck and structure to provide level, flat slab while maintaining minimum specified slab thickness.

E. Cold Weather Placing: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing action, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C) and not more than 80°F (27°C) at point of placement.
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 antifreeze agents or chemical accelerators containing calcium chloride, or chloride bearing salts. Other antifreeze agents or chemical accelerators may be used if acceptable to the Structural Engineer.

F. Hot-Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to the Structural Engineer.

3.09 FINISH OF FORMED SURFACES

A. Rough Form Finish: Provide a rough formed finish on formed concrete surfaces not exposed to view in the finished work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched with fins and other projections exceeding ¼ inch in height rubbed down or chipped off.

B. Smooth Form Finish: Provide a smooth formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical

manner with a minimum number of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring 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 MONOLITHIC SLAB FINISHES

A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, and as otherwise indicated.

B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film-finish coating system.

1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, and uniform in texture and appearance. Grind smooth surface defects that would telegraph through applied floor covering system.

C. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with the Architect before application.

D. Flatness and Levelness: Finish surfaces to flatness and levelness tolerances specified and as measured according to ASTM E1155. Grind smooth high spots and surface defects that would telegraph through applied floor covering systems.

1. Interior warehouse slabs shall meet the following requirements:
   a. Specified overall values FF = 30, FL = 20.
   b. .Minimum local values FF = 20, FL = 15.
   c. At construction joints, a 10 foot straight-edge centered on the construction joint shall not have a gap of more than 1/8 inch at center (joint too low) or either end (joint too high).
2. Interior office floor slabs shall meet the following requirements:
   a. Specified overall values FF = 25, FL = 20.
   b. Minimum local values FF = 20, FL = 15.
3. Elevated Slabs shall meet the following requirements:
   a. Specified overall values FF = 25
   b. Minimum local values FF = 17

3.11 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations.

B. Curing Methods: Perform curing of concrete by curing and sealing compound (sprayed on liquid membrane) or other methods approved.

C. Apply curing and sealing compound to exposed interior slabs and to exterior slabs, walks, and curbs as follows:

1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Re-coat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces, by application of an appropriate curing method.

3.12 REMOVAL OF FORMS

A. General: Formwork shall not be removed until concrete has attained sufficient strength to support its own weight and not be damaged by formwork removal.

3.13 REUSE OF FORMS

A. 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-coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces except as acceptable to the Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs and Ramps: Provide monolithic finish to interior curbs and ramps (where required) by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and termination's slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on the construction documents. Set anchor bolts for machines and equipment with templates at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in safety inserts and accessories as shown on the stair drawings. Screed, tamp, and finish concrete surfaces as scheduled.

3.15 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Architect.

1. Cut out honeycomb, rock pockets, voids, and holes left by tie rods and bolts, down to solid concrete. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. Place patching mortar before bonding compound has dried.
2. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas 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.

B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to the satisfaction of the Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar, or precast cement cone plugs secured in place with a bonding agent.

C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.

1. Repair finish unformed surfaces that contain defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through nonreinforced sections regardless of width, spalling, pop-outs, honeycombs, rock pockets, and other objectionable conditions.
2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to the Architect.
4. Repair defective areas, except random cracks and single holes not exceeding 1-inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least ¾-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

D. Repair methods not specified above may be used, subject to acceptance of the Structural Engineer.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. General: The construction manager shall employ a testing laboratory to perform tests and to submit test reports per Section 1400 of the specifications.

B. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge as follows:
   a. Foundations: One per test specimen set.
   b. Slabs: One test every other truck or twenty yards.

2. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one per specimen set of each type of air-entrained concrete.
3. Concrete Temperature: Test hourly during duration of pour.
4. Compression Test Specimen: ASTM C 31; one set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens. When temperature is expected to fall below 40°F (4°C), provide additional specimen for each test set. The additional specimen shall be field-cured.
5. Compressive Strength Tests: ASTM C 39; one set for each day's pour of appreciable size and for each 50 cu. yds.; one specimen tested at seven (7) days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
    a. Interior Slabs: One test specimen set per two bays of floor slab. No less than one set per pour.
    b. Exterior Slabs: One test specimen set per 4.000 sq.ft. of pavement. No less than one set per pour.
    c. Elevated Slabs: One test specimen per 5,000 sq.ft., minimum two per pour.
6. Flexure Strength of Concrete: ASTM C 78. The flexural strength of concrete used for slab-on-grades shall be established prior to start of concrete placement operations.
    a. One test specimen set per four bays of floor slab. No less than one set per pour. Four beams per specimen set mold and store for lab curing. Test one at 28 days, two at 56 days, and one specimen retained in reserve for later testing, if required.
7. When total quantity of a given class of concrete is less than 50 cu.yds., the Structural Engineer may waive strength test if adequate evidence of satisfactory strength is provided.
8. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
9. Concrete Yield Test: Minimum one (1) per project - recommend first floor slab pour.
10. Concrete Floor Flatness and Levelness
    a. Two (2) devices are used to run tests
        1. Type I device - dipstick
        2. Type II device - wheel
        3. Make sure that the device being used has been recently calibrated (within three (3) months). Due to the mathematics involved in F-numbers, instrument inaccuracies will always result in a lowering of reported F-numbers.
    b. Two (2) layout patterns per ASTM E 1155-87
        1. 45° angles to the longest boundary (x pattern). Easier to run, less time to run pattern. Must be used for narrow width floor slab pours.
        2. 90° angle to the longest boundary (+ pattern).
    c. Perform the floor flatness and levelness testing as follows:
        1. Minimum of the first three (3) slab pours.
        2. Minimum of every other slab pour after the first three (3) slab pours.

3. Testing must be performed within 48 hours after slab is poured. The result of the testing must be reported to the Contractor within 24 hours.

d. At construction joints, specify the following:

1. Specify that all construction joints must be checked with a 10-foot straight edge centered on the construction joint. Any joint that does not meet with a 1/8 inch or less gap under the straight edge, either at the center (joint too low) or at the ends (joint too high - straight edge rocks), will require grinding until the 1/8 inch tolerance is met or the joint is acceptable.
2. The construction joints must be checked within 48 hours after the last abutting slab is poured.

C. Test results will be reported in writing to Construction Manager, Structural Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests. Reports of tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, specified strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

END OF SECTION

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Precast architectural concrete exterior cladding units in locations indicated on Drawings.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: For installing connection anchors in concrete.
2. Section 04 20 00 - Unit Masonry: CMU backup for precast panels.
3. Section 04 43 13 - Limestone.
4. Section 05 50 00 - Metal Fabrications: Miscellaneous steel supports.
5. Section 07 92 00 - Joint Sealants: Sealants for joints in precast architectural concrete.

1.2 DEFINITION

A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:
1. Loads: As indicated.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

C. Shop Drawings:
1. Detail fabrication and installation of architectural precast concrete units.
2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.
3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
4. Indicate details at building corners.
5. Indicate type, size, and length of welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.
6. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
7. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
8. Indicate relationship of architectural precast concrete units to adjacent materials.

D. Samples: For each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

1. When other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Welding certificates.

C. Material Certificates: For the following items, signed by manufacturers:
1. Cementitious materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.
5. Structural-steel shapes and hollow structural sections.

D. Material Test Reports: For aggregates.

E. Source quality-control test reports.

F. Field quality-control test and special inspection reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A precast concrete erector qualified and designated by PCI's Certificate of Compliance to erect Category A (Architectural Systems) for non-load and/or S2 (Complex Structural Systems) for load-bearing members.

B. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer registered in the State of Alabama.
1. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group A, Category A1--Architectural Cladding and Load Bearing Units or in APA's Plant Certification Program for the Production of Architectural Precast Products and is designated as an APA-certified plant.

C. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

D. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

E. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

F. Welding: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4, "Structural Welding Code - Reinforcing Steel."

G. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of 2 sample panels approximately 16 sq. ft. in area for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.
   1. Locate panels where indicated or, if not indicated, as directed by Architect.
   2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.
   3. After acceptance of repair technique, maintain one sample panel at manufacturer's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
   4. Demolish and remove sample panels when directed.

H. Range Samples: After sample panel approval and before fabricating architectural precast concrete units, produce a minimum of 3 sets of samples, approximately 16 sq. ft. in area, representing anticipated range of each color and texture on Project's units. Following range sample, maintain one set of samples at Project site and remaining sample sets at manufacturer's plant as color and texture approval reference.

I. Mockups: After sample panel and range sample approval but before production of architectural precast concrete units, construct full-sized mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup as indicated on Drawings including aluminum framing, glass, sealants, and architectural precast concrete complete with anchors, connections, flashings, and joint fillers.
   2. Include one (1) 12” x 12” patch in mockup.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents unless such deviations are specifically approved by Architect in writing.

J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in “Section 01 31 00 - Project Management and Coordination.” Attendees shall include General Contractor, Precast Concrete Erector, Owner, Architect, and Patching Contractor.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground.

B. Support units during shipment on nonstaining shock-absorbing material.

C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

D. Place stored units so identification marks are clearly visible, and units can be inspected.

E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.

F. Lift and support units only at designated points shown on Shop Drawings.

1.8 SEQUENCING

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
   1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

C. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.

D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

F. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
   1. For surfaces exposed to view in finished structure, mix gray with white cement, of same type, brand, and mill source.

B. Supplementary Cementitious Materials: As recommended by Fabricator.
   1. Fly Ash: ASTM C 618, Class C or F, with maximum loss on ignition of 3 percent.
   2. Metakaolin Admixture: ASTM C 618, Class N.
   3. Silica Fume Admixture: ASTM C 1240, with optional chemical and physical requirement.
   4. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.
   1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.
      a. Gradation: To match design reference sample.
   2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand of same material as coarse aggregate, unless otherwise approved by Architect.

D. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

E. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

F. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
1. Water-Reducing Admixtures: 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. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C

2.4 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.

C. Carbon-Steel Plate: ASTM A 283.

D. Malleable Iron Castings: ASTM A 47.

E. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.

F. High-Strength, Low-Alloy Structural Steel: ASTM A 572.

G. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.

H. Wrought Carbon-Steel Bars: ASTM A 675, Grade 65.

I. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706.

J. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.

K. High-Strength Bolts and Nuts: ASTM A 325, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.

L. Zinc-Coated Finish: For steel items exposed to exterior humidity and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A 123 or ASTM A 153.
1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03 percent or to between 0.15 and 0.25 percent or limit sum of silicon and 2.5 times phosphorous content to 0.09 percent.

2. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

M. Welding Electrodes: Comply with AWS standards.

2.5 ACCESSORIES

A. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install architectural precast concrete units.

2.6 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or 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.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881, of type, grade, and class to suit requirements.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required, including repair mixes.
1. Limit use of fly ash and silica fume to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.

B. Limit use of fly ash and ground granulated blast-furnace slag to 20 percent of portland cement by weight; limit metakaolin and silica fume to 10 percent of portland cement by weight.

C. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

D. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218.

E. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
1. Compressive Strength (28 Days): 5000 psi minimum.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

F. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.

G. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117, with a minimum 4 percent total air content.

H. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.8 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: Uniformly chamfered.

2.9 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: All embedded items and accessories shall be hot-dipped galvanized. Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1 and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.

D. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.
1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.

F. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

G. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

H. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
1. Place backup concrete mixture to ensure bond with face-mixture concrete.

I. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.
1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

J. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

K. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that will not show in finished structure.

L. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
1. Curing temperature shall be less than 135 degrees.

M. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.10 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

B. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with the following product tolerances:
1. Overall Height and Width of Units, Measured at the Face Exposed to View: As follows:
   a. 10 feet or under, plus or minus 1/8 inch.
   b. 10 to 20 feet, plus 1/8 inch, minus 3/16 inch.
   c. 20 to 40 feet, plus or minus 1/4 inch.
   d. Each additional 10 feet, plus or minus 1/16 inch.
2. Overall Height and Width of Units, Measured at the Face Not Exposed to View: As follows:
   a. 10 feet or under, plus or minus 1/4 inch.
   b. 10 to 20 feet, plus 1/4 inch, minus 3/8 inch.
   c. 20 to 40 feet, plus or minus 3/8 inch.
   d. Each additional 10 feet, plus or minus 1/8 inch.

3. Total Thickness or Flange Thickness: Plus 1/4 inch, minus 1/8 inch.
4. Rib Thickness: Plus or minus 1/8 inch.
5. Rib to Edge of Flange: Plus or minus 1/8 inch.
6. Distance between Ribs: Plus or minus 1/8 inch.
7. Variation from Square or Designated Skew (Difference in Length of the Two Diagonal Measurements): Plus or minus 1/8 inch per 72 inches or 1/2 inch total, whichever is greater.
8. Length and Width of Block-outs and Openings within One Unit: Plus or minus 1/4 inch.
9. Location and Dimension of Block-outs Hidden from View and Used for HVAC and Utility Penetrations: Plus or minus 3/4 inch.
10. Dimensions of Haunches: Plus or minus 1/4 inch.
11. Haunch Bearing Surface Deviation from Specified Plane: Plus or minus 1/8 inch.
12. Difference in Relative Position of Adjacent Haunch Bearing Surfaces from Specified Relative Position: Plus or minus 1/4 inch.
13. Bowing: Plus or minus L/360, maximum 1 inch.
14. Local Smoothness: 1/4 inch per 10 feet.
15. Warping: 1/16 inch per 12 inches of distance from nearest adjacent corner.
16. Tipping and Flushness of Plates: Plus or minus 1/4 inch.
17. Dimensions of Architectural Features and Rustications: Plus or minus 1/8 inch.

2.11 FINISHES

A. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved sample panels and mockups.

2.12 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

B. Strength of precast concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.

C. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, precaster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.
   1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
   2. Cores will be tested in an air-dry condition.
   3. Strength of concrete for each series of 3 cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
   4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:
      a. Project identification name and number.
      b. Date when tests were performed.
      c. Name of precast concrete fabricator.
      d. Name of concrete testing agency.
      e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for

length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not install precast concrete units until supporting cast-in-place building structural framing has attained minimum allowable design compressive strength or supporting steel or other structure is complete.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.

B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.
1. Install temporary steel or plastic spacing shims or bearing pads as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
4. Unless otherwise indicated, maintain uniform joint widths of 3/4 inch.

C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
1. Do not permit connections to disrupt continuity of roof flashing.

D. Welding: Comply with applicable AWS D1.1 and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
1. Protect architectural precast concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
2. Welds not specified shall be continuous fillet welds, using no less than the minimum fillet as specified by AWS.
3. Clean weld-affected metal surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil-thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
4. Remove, reweld, or repair incomplete and defective welds.

E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.
   1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.

F. Grouting Connections: Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

3.3 ERECTION TOLERANCES

A. Erect architectural precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Field welds will be subject to visual inspections and nondestructive testing according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Repair or remove and replace work where tests and inspections 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.

3.5 REPAIRS

A. Repair architectural precast concrete units if permitted by Architect. The Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.6 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
   1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.
   2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION

SECTION 03 54 16

HYDRAULIC CEMENT UNDERLAYMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior, portland cement-based, self-drying, fast setting, trowelable patch for smoothing and repairing concrete floors and ramps.

B. Related Sections:
1. Section 01 21 00 - Allowances.
2. Section 01 22 00 - Unit Prices.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: Signed by manufacturers of underlayment and floor-covering systems certifying that products are compatible.

C. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

B. Product Compatibility (If applicable): Manufacturers of both underlayment and floor covering system certify in writing that products are compatible.

C. Mockups: Apply hydraulic-cement-based underlayment mockups to demonstrate surface finish, bonding, texture, tolerances, and standard of workmanship.
1. Apply mockups approximately 20 sq. ft. in area in location indicated or, if not indicated, as directed by Architect.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.
   1. Place hydraulic-cement-based underlayments only when ambient temperature and temperature of substrates are between 50 and 80 deg F.

1.7 COORDINATION

A. In areas to receive floor coverings, coordinate application of underlayment with requirements of floor covering products, including adhesives, specified in Division 09 Sections, to ensure compatibility of products.

PART 2 - PRODUCTS

2.1 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS

A. Basis-of-Design Product/Manufacturer for Underlayment: Portland cement-based, self-drying, fast setting, trowelable patch for smoothing and repairing concrete floors and ramps is based on **"ARDEX SD-P"** as manufactured by ARDEX ENGINEERED CEMENTS; 888-512-7339; www.ardex.com
   1. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Performance Requirements:
   1. Mixing Ratio: Per manufacturer's recommendations for indicated thicknesses.
   2. Initial Set: Approx. 15 minutes at 70 degrees F. when tested according to ASTM C 191.
   3. Final Set: Approx. 60 minutes at 70 degrees F. when tested according to ASTM C 191.
   4. Compressive Strength: Not less than 4,200 psi at 28 days when tested according to ASTM C 101.
   5. Flexural Strength: Not less than 1,000 psi at 28 days when tested according to ASTM C 348.

C. Thicknesses:
   1. Featheredge to 1" Thickness: Underlayment may be installed without aggregate.
   2. Areas 1" to 3" Thickness: Mix in pea gravel aggregate.

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.
   1. Basis-of-Design Product/Manufacturer:
      a. **"ARDEX P 51 PRIMER"** diluted 1:3 with water.

E. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch as recommended by underlayment manufacturer.
   1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

F. Water: Potable and at a temperature of not more than 70 deg F.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance.
   1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare, clean, and prime substrates according to manufacturer's written instructions.
   1. Treat nonmoving substrate cracks according to manufacturer's written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
   2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
   1. Moisture Testing: If required by manufacturer, perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.

C. Nonporous Substrates: For ceramic tile, quarry tile, and terrazzo substrates, remove waxes, sealants, and other contaminants that might impair underlayment bond, and prepare surfaces according to manufacturer's written instructions.

D. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.
   1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
   2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
   3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.
   1. Apply a final layer without aggregate to produce surface.
   2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

1.1 SUMMARY

A. Masonry Construction:
1. Face Brick.
2. Concrete masonry units.
3. Reinforcement, anchorage, and accessories.
4. Mortar for masonry.
5. Embedded flashings.
6. Cavity drainage system.

B. Related Sections:
1. Section 01 21 00 - Allowances: Face brick allowance.
2. Section 03 30 00 - Cast-in-Place Concrete: Steel reinforcing bars installed in unit masonry assemblies.
3. Section 03 45 00 - Precast Architectural Concrete: Precast architectural concrete units installed in unit masonry assemblies.
4. Section 04 43 13 - Limestone: Limestone units installed in unit masonry assemblies.
5. Section 05 40 00 - Cold-Formed Metal Framing: Steel stud backup for masonry veneer.
6. Section 05 50 00 - Metal Fabrications: Steel lintels and shelf angles installed in unit masonry assemblies.
7. Section 07 19 00 - Water Repellents: Water repellents for exterior face brick and stone units.
8. Section 07 21 00 - Thermal Insulation: For cavity wall insulation.
9. Section 07 27 26 - Fluid-Applied Membrane Air Barriers: Air barrier applied to cavity face of CMU backup
10. Section 07 62 00 - Sheet Metal Flashing and Trim: Manufactured reglets in masonry joints for metal flashing.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in “Section 01 31 00 - Project Management and Coordination.” Meeting shall be attended by Contractor’s superintendent, masonry installer’s foreman, and a representative from the special inspection and testing agency. The meeting shall include discussion of quality assurance and quality control for construction to meet contract requirements, coordination of inspection and testing procedures, and project schedule. Contractor shall submit meeting minutes to the Architect.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement," and ACI SP-66 ACI Detailing Manual.
2. Provide plan layout of reinforcing with associated sections and details. Provide elevations clearly indicating locations of reinforcing with lap splice locations and proposed grout placement lifts.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Verification: Provide (3) 52" x 48 face brick sample panels with mortar to confirm mortar color.

1. Building addition brick and mortar to match west façade of existing building. Submit proposed brick and sample panel for approval to Architect.

1.5 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

B. Qualification Data: For testing agency.

C. Material Certificates: For each type and size of the following:
1. Masonry units.
   a. Include data on material properties and material test reports substantiating compliance with requirements.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

D. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.7 MOCK-UPS

A. Freestanding Mockup - Brick Veneer: Construct a freestanding 8’ x 8’ onsite mock up of exterior masonry veneer wall including brick veneer and anchors, limestone trim, air barrier, control joints, sealant, and partial window.
   1. Protect approved sample panels from the elements with weather-resistant membrane.
   2. Approval of sample panel is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; air barrier integrity, aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
      a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Architect in writing.

B. Timing of Mockups: Timing of mock ups shall be in advance of full production order of materials. Mock ups shall be located so that they remain on site for quality control reference through Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry units to Project site strapped together in suitable packs or pallets or in heavy-duty cartons.

B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

D. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

E. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

F. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

G. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Concrete Masonry Units: ASTM C 90.

1. Density Classification: Lightweight.
   a. Provide units that comply with SmartWall™ specifications published by the Expanded Shale Clay and Slate Institute.
   b. The maximum Density as determined by ASTM C140 shall be 93 pcf.
2. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.
3. Materials: Lightweight aggregates shall be expanded shale, clay or slate produced by the rotary kiln method and complying with both ASTM C331 and C330.
4. Deleterious Materials: All units shall be free of organic impurities, combustible matter, coal ash aggregate (bottom ash), or any other waste products that can cause rusting, staining, or pop-outs.
5. Special Shapes: Provide for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.
6. Size: Nominal 8" x 16" x thickness as indicated.
7. Units for Exposed Interior Faces:
   a. Smooth face for all interior units.
   b. All exposed external corners shall be bullnose units.
   c. Wing wall shall be double bullnose.

2.3 BRICK

A. General: Provide shapes indicated and as follows for each form of brick required:
   1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

B. Face Brick: Wood Mold Brick ***Furnished by Owner. Pick up from Owner's storage.***
   1. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   2. Size: Modular size 2 1/4" x 3 5/8" x 7 5/8"
   3. Wood Mold Brick Colors/Textures/Blends: ***Color range and texture to match west façade of existing McLure Library.***

C. Building (Common) Brick (if required): ASTM C 62, Grade SW, and as follows:
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 4400 psi.
   2. Size: Manufactured to the following actual dimensions:
      a. Match size specified for face brick.
   3. Application: Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

2.4 MASONRY LINTELS

1. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until grout tests indicate 28-day compressive strength has been achieved.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Colored Cement Product (If required): Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Colored Portland Cement-Lime Mix:
1) Amerimix; SI 400 Series Portland Lime Mortar.
2) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
3) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
4) Lafarge North America Inc.; Eaglebond Portland & Lime.
5) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
2. Mortar Color: Match existing adjacent South Engineering Research Center (SERC).
3. Pigments shall not exceed 10 percent of portland cement by weight.

E. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

F. Aggregate for Grout: ASTM C 404.

G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Euclid Chemical Company (The); Accelguard 80.
b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

H. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
1. Interior Walls: Mill- galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods. At ends of masonry partitions, provide pre-fabricated corner and tee units to adjacent wall extending through masonry control joint.

2.7 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
   1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153/A 153M, Class B-2 coating.
   2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M.
   3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.
   1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units or hollow units laid with cells horizontal.
   2. Where wythes are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.

D. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
   2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch-diameter, hot-dip galvanized steel wire.
   3. Connector Section for Concrete: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.053-inch- thick, steel sheet, galvanized after fabrication.

E. Partition Top anchors: 0.097-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
   1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

G. Adjustable Masonry-Veneer Anchors for Metal Stud Backup: Install veneer anchors after air barrier membrane and cavity wall insulation have been installed.
   1. Approved Products:
      a. **"2-Seal Thermal Wing Nut Anchor"; Hohmann & Barnard**.
      b. **"Original Pos-I-Tie® Veneer Anchoring System with Pos-I-Tie® Thermal Clip" with self-drilling screw; Heckman Building Products, Inc.**
      c. Other Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

H. Adjustable Masonry-Veneer Anchors for CMU & Concrete Backup: Install veneer anchors after air barrier membrane and cavity wall insulation have been installed.
   1. Approved Products:
      a. **"2-Seal Thermal Concrete Wing Nut Anchor"; Hohmann & Barnard**.

b. **"Original Pos-I-Tie® Veneer Anchoring System with Pos-I-Tie® Thermal Clip" with Concrete/CMU screw; Heckman Building Products, Inc.**
c. Other Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

2.8 MISCELLANEOUS ANCHORS

A. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.

B. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.9 EMBEDDED FLASHING MATERIALS

A. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Advanced Building Products Inc.; Peel-N-Seal.
b. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
c. Dayton Superior Corporation, Dur-O-Wal Division; Dur-O-Barrier Thru-Wall Flashing.
d. Fiberweb, Clark Hammerbeam Corp.; Aquaflash 500.
e. Grace Construction Products, W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
f. Heckmann Building Products Inc.; No. 82 Rubberized-Asphalt Thru-Wall Flashing.
g. Hohmann & Barnard, Inc.; Textroflash.
h. W. R. Meadows, Inc.; Air-Shield Thru-Wall Flashing.
i. Polyguard Products, Inc.; Polyguard 400.
j. Sandell Manufacturing Co., Inc.; Sando-Seal.
k. Williams Products, Inc.; Everlastic MF-40.
2. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
3. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

B. Single-Wythe CMU Flashing System (if required): System of CMU cell flashing pans and interlocking CMU web covers made from high-density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging with mortar.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Mortar Net USA, Ltd.; Blok-Flash.

C. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Refer to "Section 07 92 00 - Joint Sealants."

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

E. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch or stainless-steel sheet 0.019 inch by 1-1/2 inches with a 3/8 inch sealant flange at top.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Strips, full-depth of cavity and 10 inches wide, with dovetail shaped notches 7 inches deep that prevent mesh from being clogged with mortar droppings.
1. Basis-of-Design Product: Mortar Net USA, Ltd.; **"Mortar Net."**

E. Weep/Vent Products:
1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.
   a. Basis-of-Design Product: Mortar Net USA, Ltd.; **"Mortar Net Weep Vents."**

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Available Products:
   a. Dayton Superior Corporation, **Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817**.
   b. Heckmann Building Products Inc.; **No. 376 Rebar Positioner.**
   c. Hohmann & Barnard, Inc.; **#RB or #RB-Twin Rebar Positioner**.
   d. Wire-Bond; **O-Ring** or **Double O-Ring Rebar Positioner.**

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner (if required): Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Available Manufacturers:
   a. **ProSoCo, Inc.**
   b. **Diedrich Technologies, Inc**.

c. **EaCo Chem, Inc.**

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
2. Limit cementitious materials in mortar to portland cement and lime.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated. NOTE: Masonry Cement is not allowed.
1. For exterior, above-grade, and non-load-bearing walls and parapet walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
2. For interior non-load-bearing partitions use Type N.
3. For masonry below grade or in contact with earth, use Type M or S.
4. For interior load-bearing walls use Type S.

D. Pigmented Mortar: Use colored cement product. Mix to match Architect's sample.

E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

F. Do not place through-wall flashing into bed joints of structural masonry walls, columns, beams, etc.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
   1. Install compressible filler in joint between top of partition and underside of structure above.
   2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches o.c. unless otherwise indicated.
   3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
   4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with “Section 07 84 00 - Firestopping.”

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow brick and CMUs as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using Masonry Veneer Anchors. Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

D. Apply air barrier to face of backup to comply with "Section 07 27 26 - Fluid-Applied Membrane Air Barriers."

E. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
   1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 16 inches o.c.
   2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
   3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
   1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
   2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
   3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.9 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing and concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
   1. Fasten screw-attached and seismic anchors through sheathing to wall framing and to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners.
   2. Embed connector sections and continuous wire in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
   3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
   4. Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:
   1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
   2. Install preformed control-joint gaskets designed to fit standard sash block.
   3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
   4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in “Section 07 92 00 - Joint Sealants,” but not less than 3/8 inch.
   1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FLASHING

A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
   2. At lintels, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
   3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in “Section 07 92 00 - Joint Sealants” for application indicated.
   4. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in “Section 07 92 00 - Joint Sealants” for application indicated.
   5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.

C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.

D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.14 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspection and testing agency to perform tests and inspections and prepare reports. Provide and allow inspectors proper access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Refer to Structural Drawings for required Special Inspections.

C. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength. Submit prior to construction.

D. Mortar Proportion, Mixing Time, and Use Time Verification: For each mix provided, verify mortar procedures are in accordance to ASTM C 270. Verify at beginning of construction and periodically throughout construction. Refer to Structural Drawings.

E. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019. Typically provide grout testing for each day of grout placement or at a minimum rate of one test per 1000 square feet of masonry placed. Provide test for grout placed in lintels.

F. Masonry Prism Test: Provide masonry prism test in accordance with ASTM C 1314 verifying compressive strength of in place masonry assembly at beginning of construction and every 5000 square feet thereafter.

3.16 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 04 43 13

LIMESTONE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Limestone wall panels.
2. Limestone trim units including, but not limited to, bands, copings, sills, jambs, heads, and watertables.
3. Limestone columns and pilasters including base and capitals.

B. Related Requirements:
1. Section 03 45 00 - Precast Architectural Concrete.
2. Section 04 20 00 - Unit Masonry: Joint reinforcement and installation & cleaning of limestone units.
3. Section 07 19 00 - Water Repellents: Water-repellent treatments for limestone.
4. Section 07 92 00 - Joint Sealants: Sealing joints in limestone with elastomeric sealants.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For limestone and accessories.

B. Shop Drawings: Show fabrication and installation details for limestone, including dimensions and profiles of stone units.
1. Show locations and details of joints between limestone units and other construction.
2. Include details of mortar joints pointed with sealant.

C. Samples for Initial Selection: For joint materials involving color selection.

D. Stone Samples for Verification: Sets for each variety, color, and finish of stone required; not less than 12 inches square.
1. Sets shall consist of at least three samples, exhibiting extremes of the full range of color and other visual characteristics expected and will establish the standard by which stone will be judged.

E. Colored Pointing Mortar Samples for Verification: For each color required. Make Samples using same sand and mortar ingredients to be used on Project.

F. Sealant Samples for Verification: For each type and color of joint sealant required.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Test Reports:

1. For metal components, by a qualified testing agency, indicating chemical and physical properties of metal
2. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in "Section 07 92 00 - Joint Sealants" and indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

C. Preconstruction test reports.

D. Source quality-control reports.

E. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate dimension stone cladding assemblies similar to that required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: A firm or individual experienced in installing dimension stone cladding assemblies similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.

C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

D. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups of typical exterior wall area as shown on Drawings not less than 72 inches long by 48 inches high.
   a. Include typical components, attachments to building structure, and methods of installation.
   b. Include window opening with stone trim.
   c. Include sealant-filled joint complying with requirements in "Section 07 92 00 - Joint Sealants."
   d. Include an area that has been damaged and repaired.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Sealant Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for compatibility and adhesion testing according to sealant manufacturer's standard testing methods and "Section 07 92 00 - Joint Sealants" samples of materials that will contact or affect joint sealants.

B. Preconstruction Field Testing of Sealants: Before installing joint sealants, field test their adhesion to joint substrates according to "Section 07 92 00 - Joint Sealants."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.
   1. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
   2. Store stone on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.

B. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical panels so that they are right side up when units are installed.

C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multi-component materials.

D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

E. Store aggregates in locations where grading and other required characteristics can be maintained and where contamination can be avoided.

1.8 FIELD CONDITIONS

A. Protect limestone during erection by doing the following:
   1. Cover tops of limestone units with nonstaining, waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold securely in place.
   2. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials without damaging stone.
   3. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
   4. Protect sills, ledges, and projections from mortar and sealant droppings.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions. Comply with cold-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

C. Hot-Weather Requirements: Comply with hot-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

D. Environmental Limitations for Sealants: Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or below 40 deg F or when joint substrates are wet.

1.9 COORDINATION

A. Coordinate installation of inserts that are to be embedded in concrete or masonry, flashing reglets, and similar items to be used by stone cladding Installer for anchoring, supporting, and flashing of stone

cladding assembly. Furnish setting drawings, templates, and directions for installing such items and deliver to Project site in time for installation.

B. Time delivery and installation of stone cladding to avoid extended on-site storage and to coordinate with work adjacent to stone cladding

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Design stone anchors and anchoring systems according to ASTM C 1242.
   1. Stone anchors shall withstand not less than two times the weight of the stone cladding in both compression and tension.

B. Structural Performance: Stone cladding assembly shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Wind Loads: As indicated.
   2. Equipment Loads: Allow for loads due to window cleaning and maintenance equipment.

C. Seismic Performance: Stone cladding assembly shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor: 1.0.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

E. Horizontal Building Movement (Interstory Drift): Allow for maximum horizontal building movement equal to quotient resulting from dividing floor-to-floor height at any floor by 400.

F. Safety Factors for Stone: Design stone cladding assembly to withstand loads indicated without exceeding stone's allowable working stress determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:
   1. Safety Factor for Oolitic Limestone: 8
   2. Safety Factor for Dolomitic Limestone: 6
   3. Safety Factor for Concentrated Stresses: 10.

G. Design stone anchors to withstand loads indicated without exceeding allowable working stresses established by the following:
   1. For Structural Steel: AISC 360.
   2. For Cold-Formed Steel: AISI's "North American Specification and Commentary for the Design of Cold-Formed Steel Structural Members."
   3. For Cold-Formed Stainless Steel: ASCE/SEI 8, "Specification for the Design of Cold-Formed Stainless Steel Structural Members."
   4. For Cast-in-Place and Postinstalled Fasteners in Concrete: One-fourth of tested capacity when installed in concrete with compressive strength indicated.
   5. For Postinstalled Fasteners in Masonry: One-sixth of tested capacity when installed in masonry units indicated.

H. Limit deflection in each prefabricated assembly caused by indicated loads and thermal movements, acting singly or in combination with one another, to not more than 1/720 of assembly's clear span or the following, whichever is smaller:

1. 1/16 inch, measured in plane of wall.
2. 1/4 inch, measured perpendicular to wall.

I. Provisions for Fabrication and Erection Tolerances: Allow for fabrication and erection tolerances of building's structural system.

J. Provision for Deflection of Building Structure:
1. Deflection Due to Weight of Stone Cladding Assembly: Allow for 1/4-inch vertical deflection in 20-foot span of structural members supporting stone cladding assembly.
2. Live Load Deflection: Allow for 1/4-inch vertical deflection, in 20-foot span of structural members supporting stone cladding assembly, due to live loads imposed on building's structural frame after stone installation.

K. Corrosion and Staining Control: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Materials shall not stain exposed surfaces of stone and joint materials.

2.2 LIMESTONE

A. Provide matched blocks extracted from a single bed of quarry stratum.
1. Make quarried blocks available for inspection by Architect.

B. If descriptions of two or more stone types are identical except for finish, provide the same variety from the same source for each type.

C. Limestone: Complying with ILI's "Indiana Limestone Handbook" and ASTM C 568.
1. Classification: Category II (Medium-Density).
2. Varieties: **Indiana Gray Limestone**
3. Finish of Exterior Limestone Cladding: Match approved sample and/or approved mockups.
4. Thicknesses/Profiles: As indicated on drawings.

2.3 MORTAR MATERIALS

A. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight. Refer to “Section 04 20 00 - Unit Masonry.”

B. Aggregate: ASTM C 144; except for joints narrower than 1/4 inch and pointing mortar, 100 percent shall pass No. 16 sieve.
1. White Aggregates: Natural white sand or ground white stone.
2. Colored Aggregates: Natural-colored sand or ground marble, granite, or other durable stone; of color necessary to produce required mortar color.

C. Water: Potable.

2.4 ANCHORS AND FASTENERS

A. Anchors and Dowels: Fabricate anchors from stainless steel, ASTM A 240/A 240M or ASTM A 666, Type 304; temper as required to support loads imposed without exceeding allowable design stresses. Fabricate dowels and pins for anchors from stainless steel, ASTM A 276, Type 304.

B. Shelf Angles: Fabricate shelf angles for limestone from hot-dip galvanized steel, ASTM A 36/A 36M for materials and ASTM A 123/A 123M for galvanizing.

C. Cast-in-Place Concrete Inserts: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel, with capability to sustain, without failure, a load equal to 4 times the loads imposed as determined by testing per ASTM E 488, conducted by a qualified independent testing agency. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

D. Postinstalled Anchor Bolts for Concrete and Masonry: Chemical anchors torque-controlled expansion anchors or undercut anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304 or 316, for anchors, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

E. Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers.
   1. For galvanized-steel shelf angles and backup structure, use carbon-steel bolts, nuts, and washers; for bolts, ASTM A 307, Grade A; for nuts, ASTM A 563, Grade A; and for washers, ASTM F 436; all hot-dip or mechanically zinc coated.

2.5 STONE ACCESSORIES

A. Anchors and Dowels: Type 304 stainless steel.

B. Setting Shims: Strips of resilient plastic or vulcanized neoprene, Type A Shore durometer hardness of 50 to 70, nonstaining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.

C. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.

D. Concealed Flashing: In accordance with “Section 04 20 00 - Unit Masonry.”

E. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, of length required to extend from exterior face of stone to cavity behind, in color selected from manufacturer's standard in accordance with “Section 04 20 00 - Unit Masonry.”

F. Sealants for Joints and Kerfs in Limestone Units: Manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in “Section 07 92 00 - Joint Sealants” and do not stain stone:
   1. Sealant for Joints in Limestone: Low-modulus, neutral-curing silicone sealant.
   2. Joint-Sealant Colors: Match color of stone.

2.6 STONE FABRICATION

A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.
   1. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

B. Control depth of stone and back check to maintain minimum clearance of 1 inch between backs of stone units and surfaces or projections of structural members, fireproofing (if any), backup walls, and other work behind stone.

C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.

D. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place.

E. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

F. Quirk-miter corners unless otherwise indicated; provide for cramp anchorage in top and bottom bed joints of corner pieces.

G. Cut stone to produce uniform joints 3/8 inch wide and in locations indicated.

H. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.

I. Fabricate molded work, including washes and drips, to produce stone shapes with a uniform profile throughout entire unit length, with precisely formed arris slightly eased to prevent snipping, and with matching profile at joints between units.

J. Carve and cut inscriptions and decorative surfaces using skilled stone carvers experienced in the successful performance of work similar to that indicated.

K. Clean backs of stone to remove rust stains, iron particles, and stone dust.

L. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
   1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

2.7 MORTAR MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.
   1. Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated. Do not use calcium chloride.
   2. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer unless otherwise indicated. Discard mortar when it has reached initial set.

B. Portland Cement-Lime Setting Mortar: Comply with ASTM C 270, Proportion Specification, **Type N** for limestone.

C. Pointing Mortar: Comply with ASTM C 270, Proportion Specification, **Type N**. Provide pointing mortar mixed to match Architect's sample and complying with the following:
   1. Packaged Portland Cement-Lime Mix Mortar: Use portland cement-lime mix of selected color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive dimension stone cladding and conditions under which dimension stone cladding will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of dimension stone cladding.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of dimension stone cladding.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING MECHANICALLY ANCHORED STONE CLADDING

A. Set stone cladding with mechanical anchors without mortar unless otherwise indicated.

B. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.

C. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with sealant indicated for filling kerfs.

D. Set stone supported on clips or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths and to prevent point loading of stone on anchors. Hold shims back from face of stone a distance at least equal to width of joint.

3.3 SETTING STONE CLADDING WITH MORTAR

A. Set stone cladding with mortar and mechanical anchors where indicated.

B. Set stone in full bed of mortar with head joints filled unless otherwise indicated.
   1. Use setting buttons of adequate size, in sufficient quantity, and of thickness required to maintain uniform joint width and to prevent mortar from extruding. Hold buttons back from face of stone a distance at least equal to width of joint, but not less than depth of pointing materials.
   2. Do not set heavy units or projecting courses until mortar in courses below has hardened enough to resist being squeezed out of joint.
   3. Support and brace projecting stones until wall above is in place and mortar has set.
   4. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes and kerfs with mortar.

C. Embed ends of sills in mortar; leave remainder of joint open until final pointing.

D. Rake out joints for pointing with mortar to depths of not less than 1/2 inch. Rake joints to uniform depths with square bottoms and clean sides.

E. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply first layer of pointing mortar in layers not more than 3/8 inch until a uniform depth is formed.

F. Point stone joints by placing pointing mortar in layers not more than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

G. Tool joints with a round jointer having a diameter 1/8 inch larger than width of joint, when pointing mortar is thumbprint hard.

H. Rake out mortar from sealant-pointed joints to depths required for sealant and sealant backing, but not less than 1/2 inch. Rake joints to uniform depths with square bottoms and clean sides.

I. Set the following stone cladding with unfilled head joints for installing joint sealants:
   1. Copings.
   2. Sills.
   3. Belt and other projecting courses.

3.4 JOINT-SEALANT INSTALLATION

A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in “Section 07 92 00 - Joint Sealants.”

3.5 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet or 1/4 inch in 20 feet or more.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.

C. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.

D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/4 inch.

E. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

F. Variation in Plane between Adjacent Surfaces (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units or adjacent surfaces indicated to be flush with units.

3.6 ADJUSTING AND CLEANING

A. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and dimension stone cladding that does not match approved samples. Damaged stone may be repaired if Architect approves methods and results.

B. Replace damaged or defective work in a manner that results in dimension stone cladding's matching approved samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean limestone units as work progresses.
   1. Remove mortar fins and smears before tooling joints.
   2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: Clean dimension stone cladding no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.

3.7 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to fabricator and installer, which ensures stonework being without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Work of this Section includes fabrication and erection of structural steel work, as shown on the drawings, specified herein and as required to complete work of this section. See drawings for schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as otherwise shown on drawings.
2. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.
3. Refer to Division 3 for anchor bolt installation in concrete and Division 4 for anchor bolt installation in masonry.

1.02 SUBMITTALS

A. General: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections.

B. Product data or manufacturer's specifications and installation instructions when requested by the Structural Engineer for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
2. High-strength bolts (each type), including nuts and washers.
3. Structural steel primer paint.
4. Shrinkage-resistant grout.

C. Shop drawings prepared under the supervision of a licensed Structural Engineer, including complete details and schedules for fabrication and assembly of structural steel members, procedures, and diagrams.

1. Include details of cuts, connections, camber, holes, and other pertinent data. Indicate welds by standard AWS symbols and show size, length, and type of each weld.
2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other sections.

D. Test reports (when conducted) on shop, field-bolted and welded connections. Include data on type of tests conducted and results.

1.03 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges".
   a. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence:
      1. "This approval constitutes the owner's acceptance of all responsibility for the design adequacy of any detail configuration of connections developed by the fabricator as a part of his preparation of these shop drawings."
2. AISC "Load and Resistance Factor Design Specification for Structural Steel Buildings," including "Commentary".
3. "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.
4. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel".
5. ASTM A6, "General requirements for delivery of rolled steel plates, shapes, sheet piling, and bars for structural use".
6. Steel Structures Painting Council "Surface Preparation Specifications" and "Painting System Specifications".

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
2. If re-certification of welders is required, re-testing will be Contractor's responsibility.

C. Fabricators and Erectors Qualifications:

1. The fabricator and erector shall have satisfactorily completed work of similar scope and shall have necessary skill, equipment, facilities and capacity to fabricate the structural steel and to perform the erection in accordance with the construction schedule and in compliance with requirements of the contract documents and specifications.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time as to not delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and relubricate before use.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel Shapes, Plates, and Bars: See structural drawings.

B. Cold-Formed Steel Tubing: ASTM A 500, Grade B, Fy = 46ksi.

C. Steel Pipe: ASTM A 53, Type E or S, Grade B; or ASTM A 501.

D. Steel Castings: ASTM A 27, Grade 65-35, medium-strength carbon steel.

E. Headed Stud-Type Shear Connectors: ASTM A 108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.

F. Anchor Bolts: ASTM A 36, nonheaded type unless otherwise indicated.

G. High Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts, and washers, complying with ASTM A 325 unless noted otherwise.

H. Electrodes for Welding: E70XX, compatible with base metal. Comply with AWS code.

I. Structural Steel Primer Paint: Fabricator's standard rust-inhibiting primer. Submit product data.

J. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water-reducing agents, complying with CE-CRD-C621.

2.02 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

1. Minimum connections shall comply with appropriate tables headed "Framed Beam Connections" shown in the AISC "Manual of Steel Construction". Seated connections may be used only when they do not interfere with architectural features.
2. Beam to column connections shall be designed as to minimize eccentric loading of the column. Unrestrained simple beam end connections shall be detailed and fabricated so as to minimize end restraint of the beam. All parts of such connections (such as welds, bolts, and material) shall be designed taking eccentricity into account.
3. Connections shall be designed and detailed for loads and reactions indicated on structural drawings.

C. Bolt field connections, except where welded connections or other connections are indicated.

1. Provide high-strength threaded fasteners for bolted connections.

D. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts".

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

F. Assemble and weld built-up sections by methods that will produce true alignment of axes without warp.

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld shear connectors in field to beams and girders in composite construction. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

H. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.03 SHOP PAINTING

A. General: Shop-paint structural steel which in it's final state is exposed to view or weather except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel that is partially exposed on exposed portions and initial 2-inches of embedded areas only.

1. Examples of shop painted structural steel members are: All steel in warehouse/industrial buildings, office tower fluid cooler and screen wall supports, and steel in retail buildngs unenclosed until leased.
2. Structural steel in office towers and similar structures need not be painted unless exposed to weather, such as lintels, steel protruding above roof lines, etc.
3. Do not paint surfaces to be welded or high-strength bolted with slip critical type connections.
4. Do not paint surfaces scheduled to receive sprayed-on fireproofing.
5. Do not paint surfaces receiving shear stud connections.

B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale, and spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC) as follows:

1. SP-2 "Hand-Tool Cleaning".
2. Remove oil and grease in accordance with SP-1 "Solvent Cleaning".

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 2.0 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.04 SOURCE QUALITY CONTROL

A. General: The fabricator shall provide effective full-time quality control over all fabrication activities. This shall include ultra-sonic, magnetic particle, dye penetrant, x-ray, or other effective means of ensuring that all welds conform to AWS standards. At Owner's discretion, materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve the Fabricator of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. Promptly remove and replace materials or fabricated components that do not comply.

PART 3 - EXECUTION

3.01 ERECTION

A. Examine substrates and adjoining construction and conditions under which work is to be installed. Do not proceed with work until unsatisfactory conditions detrimental to the proper and timely completion of the work have been corrected.

B. Anchor Bolts: Check alignment and elevations of all column supports and location of anchor bolts with transit and level instruments before starting erection. Notify the Structural Engineer of any errors.

C. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. The Contractor is fully responsible for the design, detailing and adequacy of all temporary bracing and methods of construction.

D. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.

E. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond surfaces. Clean bottom surface of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure.
4. For proprietary grout materials, comply with manufacturer's instructions.

F. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

G. Level and plumb individual members of the structure within specified AISC tolerances.

H. Splice members only where indicated and accepted on shop drawings.

I. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing unless approved by the Structural Engineer. Finish gas-cut sections equal to a sheared appearance when permitted.

J. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Apply paint to exposed areas using same material as used for shop painting.

1. Apply by brush or spray to provide minimum dry film thickness of 2 mils.

3.02 QUALITY CONTROL

A. The Owner, at his option, will engage an independent testing and inspection agency to inspect high-strength bolted connections and welded connections and to perform tests and prepare test reports.

B. The testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements, and specifically state any deviations therefrom.

C. Provide access for the testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. The testing agency may inspect structural steel at plant before shipment.

E. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements.

END OF SECTION

SECTION 05 31 00

STEEL DECK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Composite floor deck.

B. Related Sections include the following

1. Division 3 Section 03 30 00 "Cast-in-Place Concrete" for concrete fill.
2. Division 5 Section 05 12 00 "Structural Steel" for shop- and field-welded shear connectors.
3. Division 5 Section 05 50 00 "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.03 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Welding certificates.

E. Field quality-control test and inspection reports.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
1. Mechanical fasteners.

G. Research/Evaluation Reports: For steel deck.

1.04 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

B. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

D. 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."

E. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.05 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 2 PRODUCTS

2.01 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:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Steel Deck:

a. ASC Profiles, Inc.
b. Canam Steel Corp.;The Canam Manac Group.
c. Consolidated Systems, Inc.
d. DACS, Inc.
e. D-Mac Industries Inc.
f. Epic Metals Corporation.
g. Marlyn Steel Decks, Inc.
h. New Millennium Building Systems, LLC.
i. Nucor Corp.; Vulcraft Division.
j. Roof Deck, Inc.
k. United Steel Deck, Inc.
l. Valley Joist; Division of EBSCO Industries, Inc.
m. Verco Manufacturing Co.
n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.02 COMPOSITE FLOOR DECK

A. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
   1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33 G60 zinc coating.
   2. Profile Depth: As indicated.
   3. Design Uncoated-Steel Thickness: As indicated.
   4. Span Condition: Triple Span

2.03 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 recommended by SDI Publication No. 30 for overhang and slab depth.

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, 0.0747 inch (1.90 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

J. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level or sloped recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.

K. Flat Sump Plate: 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.

L. Galvanizing Repair Paint: ASTM A 780.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.02 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, and requirements in this Section.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate deck bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.

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

3.03 INSTALLATION OF FLOOR DECK

A. This article includes installation requirements for classes of floor deck and form deck used in floor applications. Revise first paragraph below and insert requirements if mechanical fastening to supports is permitted.

B. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:

1. Weld Diameter: **3/4 inch**, nominal.
2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches (457 mm) apart.
3. Weld Spacing: Space and locate welds as indicated.
4. Weld Washers: Install weld washers at each weld location.

C. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches (914 mm), and as follows:

1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
2. Mechanically clinch or button punch.
3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.

D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of **1-1/2 inches,** with end joints as follows:

1. End Joints: **Lapped.**

E. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

F. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

G. Install piercing hanger tabs at **14 inches** apart in both directions, within 9 inches of walls at ends, and not more than 12 inches from walls at sides unless otherwise indicated.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field welds will be subject to inspection.

C. 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.

3.05 REPAIRS AND 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 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior non-load-bearing wall framing.

B. Related Sections:
1. Section 07 21 00 - Thermal Insulation: Batt insulation installed in cold-formed metal framing.
2. Section 07 21 33 – Sprayed Foam Insulation: Foam insulation installed in cold-formed metal framing.
3. Section 07 27 23 - Gypsum Board Barriers: Gypsum board air barriers attached to cold-formed metal framing.
4. Section 09 22 16 - Non-Structural Metal Framing: Interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in "Section 01 31 00 - Project Management and Coordination." Contractor shall meet with cold-formed framing installer and coordinate activities with other disciplines prior to installation of cold-formed framing system.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. 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.
3. Shop drawings with associated calculations shall be signed and sealed by a professional engineer licensed in the State of Alabama. Cold formed framing system shall be designed to resist curtain wall and storefront loads, dead loads, wind loads, and thermal movements.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Qualification Data: For testing agency professional engineer.

C. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:
1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.

4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

D. Research / Evaluation Reports: For cold-formed steel framing.
1. Metal stud manufacturer to have a 3rd party evaluation report for its products that are reviewed to the local building code or its model code.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Member in good standing of Steel Framing Industry Association (SFIA).
1. Products to be certified under an independent third part inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.

B. 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.

C. 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".

D. Fire-Test-Response Characteristics: Where indicated, provide cold-formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by, and displaying a classification label from, a testing and inspecting agency acceptable to authorities having jurisdiction.

E. AISI Specifications and Standards: Comply with:
1. AISI S100 “North American Specification for the Design of Cold-Formed Steel Structural Members”.
2. AISI S200 “North American Standard for Cold-Formed Steel Framing – General Provisions”.
3. AISI S201 “North American Standard for Cold-Formed Steel Framing – Product Standard”.
4. AISI S211 “North American Standard for Cold-Formed Steel Framing – Wall Stud Design”.
5. AISI S212 “North American Standard for Cold-Formed Steel Framing – Header Design”.
6. AISI S213 “North American Standard for Cold-Formed Steel Framing – Lateral Design”.
7. AISI “Code of Standard Practice for Cold-Formed Steel Structural Framing”.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide cold-formed metal framing products manufactured by **CLARKDIETRICH BUILDING SYSTEMS,** 9100 Centre Pointe Dr., Suite 210, West Chester, OH 45069; phone: (513) 870-1100; Website: www.clarkdietrich.com as specified in other Part 2 articles, or comparable products from manufacturers that are members of the SFIA.

1. Approved Substitutions:
   a. MarinoWARE.
   b. Nuconsteel; a Nucor Company.
   c. Steel Network, Inc. (The).
   d. Steel Structural Systems.
   e. United Steel Manufacturing
2. Other Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: Design to resist code applied wind and seismic loads along with supported dead loads of finishes. Finishes indicated on architectural drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Wall and Soffit Framing: Horizontal deflection of L/360 for lightweight finishes and L/600 for framing backing brick based on the wall height from support to support.
   3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
   4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 3/4 inch.
   5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

C. 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.

D. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

E. 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. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: As required by structural performance.

2. Coating: Provide the following as applicable:
   a. G60 (default minimum).
   b. G90 (for masonry backup)
   c. A60 is not permitted.

B. Steel Sheet for Vertical Deflection or Drift Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
1. Grade: Grade 50.
2. Coating: G90.

2.4 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: 0.0538 inch (16 gauge), unless otherwise noted on Drawings.
2. Minimum 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: 0.0538 inch (16 gauge), unless otherwise noted on Drawings.
2. Minimum Flange Width: 1-1/4 inches.

C. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
1. Basis-of-Design Product: ClarkDietrich Building Systems**; Heavy Duty Stud (HDS)** and **ProX Header.**
2. Minimum Base-Metal Thickness: Matching steel studs, but not less than 0.0538 inch.
3. Web and Flange Widths, Type HDS: 6 by 3 by 2-1/4 by 3/4 inch.

D. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web and capable of resisting forces imposed by the wall system.
1. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; "**FCSC," "FS12," "FS15," "FS24," "QC," "SD**," or a comparable product by one of the following:
   a. Simpson Strong-Tie.
   b. Steel Network, Inc. (The).
   c. Super Stud Building Products
   d. Marino-Ware
2. Minimum Base-Metal Thickness: Manufacturer's standard.

E. Deflection Track and Firestop Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Basis-of-Design Product: ClarkDietrich Building Systems; **Blazeframe Deflection Track.**

F. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure, as follows:

1. Basis-of-Design Product: ClarkDietrich Building Systems; **"Blazeframe DSL," "MaxTrak,"** or **"SLP-TRK"** Slotted Deflection Track.
2. Standard Leg: 2-1/2 inches.
3. Standard Vertical Slot in Leg: 1-1/2 inches.
4. Minimum Yield Strength and Thickness: 50 ksi; 0.0538 inch.

G. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure. Install a continuous row of bridging, composed of 1-1/2 inch cold-formed channel secured to each stud with clip angle or Spazzer 5400, at upper-most knockout, not more than 12 inches from top of wall.
1. Basis-of-Design Product: ClarkDietrich Building Systems; **"Blazeframe DL"** Deflection Track or a comparable product by one of the members of the SFIA.
2. Minimum Base-Metal Thickness: 0.0538 inch.
3. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.

H. U-Channel: Manufacturer's standard length.
1. Basis-of-Design Product: ClarkDietrich Building Systems; **"U-Channel"**
2. Size: 1-1/2 inches.
3. Minimum Base-Metal Thickness: 0.0538 inch.

I. Bridging and Spacer Bar:
1. Basis-of Design-Product: ClarkDietrich Building Systems; **"TradeReady Spazzer 5400 (SPZS)"** or "**Spazzer Bar Guard (SPBG)**"
2. Minimum Base-Metal Thickness: 0.0538 inch.
3. Size: 1-1/4 by 1-1/4 by 50 inches long, pre-notched at 12, 16, and 24 inches centers.

J. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
   a. Minimum Base-Metal Thickness: 0.0538 inch.
   b. Flange Width: 1 inch plus the design gap for one-story structures and 1 inch plus twice the design gap for other applications.
2. Inner Track: Of web depth indicated, and as follows:
   a. Minimum Base-Metal Thickness: 0.0538 inch.
   b. Flange Width: Insert dimension equal to sum of outer deflection track flange width plus 1 inch.

K. 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.

2.5 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:
      a. Basis-of-Design Product: ClarkDietrich Building Systems; **"Spazzer 5400 Bridging Bar (SPZS)"** or **"Spazzer Bar Guard (SPBG)"**
   3. Web stiffeners:
      a. Basis-of-Design Product: ClarkDietrich Building Systems; **"QTWS"**
   4. Anchor clips.
   5. End clips.
   6. Foundation clips.
   7. Gusset plates.
   8. Stud kickers, knee braces, and girts.
   9. Joist hangers and end closures.
   10. Hole reinforcing plates.
   11. Backer plates.

2.6 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 55, threaded carbon-steel hex-headed 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 capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent 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.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, DOD-P-21035, or 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, nonleaching.

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.

2.8 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
   4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
   2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

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 wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

D. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Install cold-formed framing in accordance with ASTM C1007 and AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions".

B. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

C. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

D. 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.

E. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.
1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

F. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

G. 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.

H. Do not bridge building expansion and control joints with cold-formed steel framing. Independently frame both sides of joints.

I. Install insulation, specified in “Section 07 21 00 - Building Insulation,” in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

J. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

K. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to 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 using one of the following methods.
   1. Install single-leg deflection tracks and anchor to building structure.
   2. Install double deep-leg deflection tracks and anchor outer track to building structure.
   3. Connect vertical deflection clips to bypassing or infill studs and anchor to building structure.
   4. Connect drift clips to cold-formed metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges unless using proprietary slotted single-track member which provides for positive attachment at the head-of-wall construction.
      a. Install solid blocking at 96-inch centers, or as otherwise indicated on Shop Drawings.
   2. Bridging: Install proprietary bridging bars according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Contractor review framing prior to installation of finishes for coordination with finishes and compliance with approved framing submittal.

B. Field and shop welds will be subject to testing and inspecting.

C. Remove and replace work where test results indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal 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 metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Steel framing and supports for ceiling-hung toilet compartments.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for countertops.
4. Steel framing and supports for mechanical and electrical equipment.
5. Steel framing and supports where framing and supports are not specified in other Sections.
6. Elevator machine beams, hoist beams, and divider beams.
7. Steel shapes for supporting elevator door sills.
8. Shelf angles.
9. Ladder for elevator pit.
10. Miscellaneous steel trim including steel edgings.
11. Metal bollards.
12. Loose steel lintels.
13. Loose bearing and leveling plates for applications where they are not specified in other Sections

B. Products furnished, but not installed, under this Section:
1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Sections:
1. Section 03 30 00 - Cast-in-Place Concrete: Installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 04 20 00 - Unit Masonry: Installing loose lintels, anchor bolts, and built-in items.
3. Section 05 12 00 - Structural Steel Framing: Structural steel framing system components.
4. Section 05 40 00 - Cold-Formed Metal Framing.
5. Section 05 51 00 - Metal Stairs: Metal-framed stairs.
6. Section 09 91 00 - Painting.
7. Section 14 21 00 –Traction Elevators.

1.2 ACTION SUBMITTALS

A. Product Data:
1. Paint products.
2. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.
1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

C. Templates: For anchors and bolts.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

D. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.5 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304

D. Steel Tubing: ASTM A 500, cold-formed steel tubing.

E. Steel Pipe: ASTM A 53, standard weight (Schedule 40) unless otherwise indicated.

F. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
1. Size of Channels: 1-5/8 by 1-5/8 inches.
2. Material: Galvanized steel, ASTM A 653, commercial steel, Type B structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness.

G. Cast Iron: Either gray iron, ASTM A 48, or malleable iron, ASTM A 47, unless otherwise indicated.

2.4 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

2.5 FASTENERS

A. General: Unless otherwise indicated, provide Series 300 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.
3. Provide stainless-steel fasteners for fastening nickel silver.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.

D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3.

G. Lag Screws: ASME B18.2.1.

H. Wood Screws: Flat head, ASME B18.6.1.

I. Plain Washers: Round, ASME B18.22.1.

J. Lock Washers: Helical, spring type, ASME B18.21.1.

K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.6 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with “Section 09 91 00 - Painting.”

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Concrete: Comply with “Section 03 30 00 - Cast-in-Place Concrete” for normal-weight, air-entrained,

2.7 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
   1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Fabricate units from slotted channel framing where indicated.
   2. Furnish inserts for units installed after concrete is placed.

C. Ceiling-Hung Toilet Compartments: Provide and Fabricate supports for operable partitions, ceiling-hung toilet compartments, overhead doors, etc. from continuous steel beams of sizes recommended by manufacturer with attached bearing plates, anchors, and braces as recommended by manufacturer. Drill or punch bottom flanges of beams to receive hanger rods; locate holes where indicated on Shop Drawings.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports with primer specified in “Section 09 91 00 - Painting.”

2.9 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
   1. Provide mitered and welded units at corners.
   2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Prime shelf angles located in interior walls with primer specified in this Section.

D. Galvanize shelf angles located in exterior walls.

E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete. Refer to “Section 03 30 00 - Cast-In-Place Concrete.”

2.10 METAL LADDERS

A. General:
   1. Comply with ANSI A14.3 unless otherwise indicated.
   2. For elevator pit ladders, comply with ASME A17.1.

B. Steel Ladders for Elevator Pit:
   1. Space siderails 18 inches apart unless otherwise indicated.
   2. Space siderails of elevator pit ladders 12 inches apart.
   3. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges.
   4. Rungs: 3/4-inch- diameter steel bars.
   5. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
   6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
      a. Products: Subject to compliance with requirements, provide one of the following:
         1) IKG Industries, a division of Harsco Corporation; Mebac.
         2) SlipNOT Metal Safety Flooring, a W. S. Molnar company; SlipNOT.
   7. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 3/4 inch in least dimension.
   8. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
   9. Galvanize exterior ladders, including brackets and fasteners.
   10. Prime interior ladders, including brackets and fasteners, with primer specified in “Section 09 91 00 - Painting.”

2.11 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim.

D. Prime interior miscellaneous steel trim with primer specified in this Section.

2.12 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe or steel shapes as indicated.

B. Fabricate sleeves for bollard anchorage from steel pipe or tubing with 1/4-inch- thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.

C. Removable Bollards: Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4 inch steel machine bolt.

D. Prime bollards with primer specified in “Section 09 91 00 - Painting.”

2.13 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

C. Prime plates with zinc-rich primer.

2.14 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in interior walls with primer specified in “Section 09 91 00 - Painting.”

2.15 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.16 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.17 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153 for steel and iron hardware and with ASTM A 123 for other steel and iron products.
   1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

C. Shop prime with primers specified in “Section 09 91 00 - Painting” as applicable.

D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
   1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   3. Items Indicated to Receive Primers Specified in “Section 09 91 00 - Painting”: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.18 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
   1. Cast Aluminum: Heavy coat of bituminous paint.
   2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

C. Support steel girders on solid grouted masonry, concrete or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
   1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

D. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
   1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING METAL BOLLARDS

A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
   1. Do not fill removable bollards with concrete.

B. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete or in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

C. Removable Bollards: Anchor internal sleeves for removable bollards in concrete by inserting into pipe sleeves preset into concrete or formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of sleeve]. Fill annular space around internal sleeves solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.

D. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner will furnish padlocks.

E. Fill bollards solidly with concrete, mounding top surface to shed water.
   1. Do not fill removable bollards with concrete.

3.4 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
   1. Use nonshrink, nonmetallic grout.
   2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in “Section 09 91 00 - Painting.”

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 05 51 00

METAL STAIRS

1.1 SUMMARY

A. Section Includes:
   1. Industrial-type stairs with steel grating treads.

B. Related Sections:
   1. Section 05 73 13 - Glazed Decorative Metal Railings: Glass railing system for monumental stair.
   2. Section 06 10 00 - Rough Carpentry: Wood blocking for anchoring railings.
   3. Section 09 91 00 - Painting: Field-applied finish for metal stairs and railings.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Uniform Load: 100 lbf/sq. ft.
   2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
   3. Uniform and concentrated loads need not be assumed to act concurrently.
   4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
   5. Limit deflection of treads, platforms, and framing members to L/360.

B. Structural Performance of Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Infill of Guards:
      a. Concentrated load of 200 lbf applied horizontally on an area of 1 sq. ft.
      b. Uniform load of 25 lbf/sq. ft. applied horizontally.
      c. Infill load and other loads need not be assumed to act concurrently.

C. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Component Importance Factor is 1.5.

1.3 ACTION SUBMITTALS

A. Product Data: For metal stairs.
   1. Paint products if applicable.
   2. Grout if applicable.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Calculations: Provide calculations showing compliance with performance requirements and design criteria, signed and sealed by a qualified professional engineer registered in state of Alabama.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer's Instructions: Submit manufacturer's storage and installation instructions.

B. Qualification Statements:
1. Submit certificate verification that manufacturer is American Institute of Steel Construction (AISC) Certified for Standard Steel Building Structures.
2. Submit letter of verification for Installer's Qualifications.

C. Qualification Data: For qualified professional engineer.

D. Welding certificates.

E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for stairs and railings.
1. Test railings according ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
1. Preassembled Stairs: Commercial class.

C. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 DELIVERY, STORAGE & HANDLING

A. Deliver materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.

B. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, structural steel posts, and

items with integral anchors, that are to be embedded in concrete or masonry or installed prior to roof installation.
1. Deliver such items to Project site in time for installation.

C. Coordinate locations of hanger rods, posts, or struts with other work so that they will not encroach on required stair width.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
1. Alfab, Inc.
2. American Stair, Inc.
3. Sharon Companies Ltd.

B. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Pipe: To ASTM A53 Type E or S, Grade B.

C. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Wire Rod for Grating Crossbars: ASTM A 510.

F. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, either commercial steel, Type B, or structural steel, Grade 25, unless another grade is required by design loads; exposed.

G. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, Grade 30, unless another grade is required by design loads.

2.4 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, hot-dip or mechanically deposited, zinc-coated anchor bolts; ASME B18.6.3.

D. Lag Bolts: ASME B18.2.1.

E. Plain Washers: Round, ASME B18.22.1.

F. Lock Washers: Helical, spring type, ASME B18.21.1.

G. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
   1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with “Section 09 91 00 - Painting.”

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

E. Concrete Materials and Properties (if applicable): Comply with requirements in “Section 03 30 00 - Cast-in-Place Concrete” for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

F. Welded Wire Fabric: ASTM A 185, 6 by 6 inches--W1.4 by W1.4, unless otherwise indicated.

2.6 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
   1. Join components by welding, unless otherwise indicated.
   2. Use connections that maintain structural value of joined pieces.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously, unless otherwise indicated.
5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

2.7 STEEL-FRAMED STAIRS

A. Stair Framing:
1. Fabricate stringers of steel channels or tubes.
   a. Provide closures for exposed ends of channel or tube stringers.
2. Construct platforms of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
3. Weld stringers to headers; weld framing members to stringers and headers.
4. Where stairs are enclosed by gypsum board or shaft-wall assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

B. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."
1. Fabricate treads and platforms from welded steel grating with 1-1/4-by-3/16-inch bearing bars at 15/16 inch o.c. and crossbars at 4 inches o.c.
2. Fabricate treads and platforms from welded steel grating with openings in gratings no more than 3/4 inch in least dimension.
3. Surface: Plain.
4. Finish: Galvanized.
5. Fabricate grating treads with rolled-steel floor plate or cast abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.

2.8 STEEL RAILINGS

A. General: Fabricate railings and balustrades to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

C. Form changes in direction of railings as follows:
   1. By bending or by inserting prefabricated elbow fittings.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

E. Close exposed ends of railing members with prefabricated end fittings.

F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
   1. Connect posts to stair framing by direct welding, unless otherwise indicated.
   2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

H. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.9 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Shop prime railing to be field painted with primers specified in “Section 09 91 00 - Painting.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditions of substrates previously installed under other sections or contracts are acceptable for product installation in accordance with manufacturer’s instructions prior to metal stair and railing installation.
   1. Inform Architect of unacceptable conditions immediately upon discovery.

2. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Architect.

3.2 PREPARATION

A. Ensure structure or substrate is adequate to support metal stairs and railings.

3.3 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.4 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
1. Use nonmetallic, nonshrink grout unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain

3.5 INSTALLING STEEL RAILINGS

A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:
   1. Anchor posts to steel by welding directly to steel supporting members.
   2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.

B. Attach steel handrails to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
   1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
   2. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   3. For hollow masonry anchorage, use toggle bolts.
   4. For steel-framed gypsum board assemblies, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.

3.6 ADJUSTING

A. Adjust components and systems for correct function and operation in accordance with manufacturer's written instructions.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

3.7 CLEANING

A. Upon completion, remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

SECTION 05 51 33

FIXED ALUMINUM LADDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Roof access ladders.
   1. Aluminum ship's ladder with platform and return.

B. Related Sections:
   1. Section 05 50 00 - Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.
   2. Section 07 54 19 - Polyvinyl-Chloride (PVC-KEE) Roofing System.
   3. Section 07 72 00 - Roof Accessories: Roof curbs for support of ship's ladders.

1.2 REFERENCES

A. AA – Aluminum Association.

B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

D. OSHA 1910.27 - Fixed Ladders.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Shop Drawings:
   1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
   2. Provide templates for anchors and bolts specified for installation under other Sections.
   3. Provide reaction loads for each hanger and bracket.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates and Qualification Data: Provide proof of compliance with items listed in Quality Assurance article.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm with not less than ten (10) years of experience in producing aluminum metal ladders similar to those indicated for this Project including the following:
   1. Record of successful in-service performance.
   2. Sufficient production capacity to produce required units.

3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.

B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.

C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Install ladder in area designated by Architect.
2. Do not proceed with remaining work until workmanship and installation are approved by Architect.
3. Rework mock-up as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurement before fabrication.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.8 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited (5) five-year warranty against defects in materials and workmanship commencing on date of Substantial Completion including the following:
1. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
2. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-Of-Design Product/Manufacturer: Fixed aluminum access ladders and ship's ladders are based on products as manufactured by **O'KEEFFE'S, INC**.; 100 N Hill Drive, Suite 12, Brisbane, CA 94005. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900; Email: info@okeeffes.com; Web: http://www.okeeffes.com
1. Approved Substitutions:
a. Alaco Ladder Company.
b. ACL Industries, Inc.
c. Precision Ladders, LLC.
2. Other Substitutions: In accordance with Section 01 25 13 - Product Substitution Procedures.

B. MATERIALS

C. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.

D. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

E. Fasteners: Series 300 stainless steel, in accordance with "Section 05 50 00 - Metal Fabrications."

2.2 SHIPS LADDERS

A. Ship's Ladder with Platform and Return (60 degree):
1. Basis-of-Design: **"Model 522A"**; O'Keeffe's Inc.

2.3 FABRICATION

A. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18–3/8 inches (467mm) long, formed from tubular aluminum extrusions; squared and deeply serrated on all sides.
1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.

B. Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.

C. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.

D. Ship Ladders: Not less than 1-1/4 inches (32mm) high, 4-1/8 inch (105 mm) deep and 2 feet (610 mm) wide; tread spacing shall be 1 foot (305 mm) on center. Handrails shall be aluminum pipe, not less than 1-1/2 inches (38 mm) in diameter with hemispheric end caps.

E. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.

F. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.

2.4 FINISHES

A. Manufacturer's standard mill finished aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance. Do not begin installation until substrates have been properly prepared.

B. Do not begin installation until supporting structure is complete and ladder/stair installations will not interfere with supporting structure work.

C. If supporting structure preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, and in compliance with OSHA regulations.

3.3 PROTECTION

A. Protect installed products and adjacent construction until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 05 52 13

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Shop-fabricated steel pipe railings in locations indicated; field-painted.

B. Related Sections:
1. Section 05 73 00 - Decorative Metal Railings.
2. Section 06 10 00 - Rough Carpentry: Wood blocking for anchoring railings.
3. Section 09 91 00 - Painting: Paint finish for railings.

1.2 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
1. Steel: 72 percent of minimum yield strength.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill of Guards:
a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
1. Railing brackets.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Tubing: ASTM A 500 (cold formed) or ASTM A 513.

C. Pipe: ASTM A 53, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
1. Provide galvanized finish for exterior installations and where indicated.

D. Plates, Shapes, and Bars: ASTM A 36.

E. Cast Iron: Either gray iron, ASTM A 48, or malleable iron, ASTM A 47, unless otherwise indicated.

2.3 FASTENERS

A. General: Provide the following:
1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153 or ASTM F 2329 for zinc coating.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primers: Provide primers that comply with “Section 09 91 00 - Painting”

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
   1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is fabricator's standard splicing method.

J. Form changes in direction as follows:
   1. By bending or by inserting prefabricated elbow fittings.

K. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of railing members with prefabricated end fittings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

P. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

Q. For removable railing posts, fabricate slip-fit sockets from steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.

R. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.6 FINISHES

A. Steel and Iron:
1. Shop-Primed Steel Finish: Prepare to comply with SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning" and apply primer to comply with SSPC-PA 1.
2. Field Painting: Field paint in accordance with “Section 09 91 00 - Painting.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

C. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.

D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
   1. Use type of bracket with predrilled hole for exposed bolt anchorage.
   2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:
   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.

3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.
5. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
6. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Clean railings by washing thoroughly with clean water and soap and rinsing with clean water.

B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings. Remove protective coverings at time of Substantial Completion.

END OF SECTION

SECTION 05 73 00

DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior and exterior steel and iron decorative railings with bronze rail cap.

B. Related Sections:
1. Section 05 51 00 - Metal Stairs: Railings for preassembled steel stairs.
2. Section 06 10 00 - Rough Carpentry: Wood blocking for anchoring decorative metal railings.
3. Section 09 91 00 - Painting: Field-applied finish for steel and iron railings.

1.2 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
1. Stainless Steel: 60 percent of minimum yield strength.
2. Steel: 72 percent of minimum yield strength.

B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
1. Handrails and Top Rails of Guards:
   a. Uniform load of 50-lbf/ ft. applied in any direction.
   b. Concentrated load of 200 lbf applied in any direction.
   c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill of Guards:
   a. Concentrated load of 200 lbf applied horizontally on an area of 1 sq. ft.
   b. Uniform load of 25 lbf/sq. ft. applied horizontally.
   c. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Exterior railings shall 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, ambient; 180 deg F, material surfaces.

D. Corrosion Control: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 ACTION SUBMITTALS

A. Product Data:
1. For each type of railing indicated.
2. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples: For each type of exposed finish required.
   1. Sections of each different linear railing member, including handrails, top rails, posts, and balusters.
   2. Fittings and brackets.
   3. Welded connections.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified fabricator.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing through one source from a single fabricator.

B. Fabricator Qualifications: A firm experienced in producing decorative metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Installer Qualifications: Fabricator of products.

D. Templates: Supply installation templates, required reinforcing, and recessed anchorage devices in timely fashion to installers of related work that will receive products of this section.

E. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and not less than 24 inches in length.
   2. Mockup may remain in place upon Architect’s approval.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
   2. Provide allowance for trimming and fitting at site.

1.7 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
1. Provide either formed- or cast-metal brackets with predrilled hole for exposed bolt anchorage.

2.2 STEEL AND IRON

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

B. Bars: Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.

C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

D. Castings: Either gray or malleable iron, unless otherwise indicated.
1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
2. Malleable Iron: ASTM A 47/A 47M.

2.3 BRONZE

A. Extruded Shapes: ASTM B 455, Alloy UNS C38500 (architectural bronze).

B. Pipe: ASTM B 43, Alloy UNS C23000 (red brass, 85 percent copper).

C. Tube: ASTM B 135 Alloy UNS C23000 (red brass, 85 percent copper).

D. Castings: ASTM B 62, Alloy UNS C83600 (85-5-5-5 or No. 1 composition commercial red brass) or ASTM B 584, Alloy UNS C86500 (No. 1 manganese bronze)].

E. Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS C28000 (muntz metal, 60 percent copper).

2.4 FASTENERS

A. General: Provide the following:
   1. Copper-Alloy (Bronze) Items: Silicon bronze (Alloy 651 or Alloy 655) fasteners where concealed, muntz metal (Alloy 280) fasteners where exposed.
   2. Stainless-Steel Components: Type 304 stainless-steel fasteners.
   3. Uncoated Steel Components: Type 304 stainless-steel fasteners where exposed.
   4. Dissimilar Metals: Type 304 stainless-steel fasteners.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work, unless otherwise indicated.
   1. Provide tamper-resistant hex socket flat-head machine screws for exposed fasteners, unless otherwise indicated.

D. Anchors: Provide cast-in-place, chemical, or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Shop Primers: Provide primers that comply with “Section 09 91 00 - Painting.”

C. Intermediate Coats and Topcoats: Provide primers that comply with “Section 09 91 00 - Painting.”

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

F. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   1. Water-Resistant Product: At exterior locations and provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

F. Connections: Fabricate railings with welded connections unless otherwise indicated.

G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

H. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
   1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

I. Form changes in direction as follows:
   1. By bending or by inserting prefabricated elbow fittings.

J. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of hollow railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
   1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

O. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

P. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

2.8 STEEL AND IRON FINISHES

A. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:
1. Exterior Railings (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interior Railings (SSPC Zone 1A): SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

D. Apply shop primer to prepared surfaces of railings, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

E. Painted Finish: Comply with “Section 09 91 00 - Painting.”

2.9 COPPER-ALLOY FINISHES

A. Finish designations for copper alloys comply with the system for designating copper-alloy finish systems defined in NAAMM's "Metal Finishes Manual for Architectural and Metal Products."

B. Buffed Finish: M21 (Mechanical Finish: buffed, smooth specular).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
   3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Part 2 "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8-inch buildup, sloped away from post.

C. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   1. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.
   2. For steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

D. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.5 ANCHORING RAILING ENDS

A. Anchor railing ends to concrete and masonry with sleeves concealed within railing ends or brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.

B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

3.6 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to walls with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:
   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.
   3. For steel-framed gypsum board partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.

3.7 CLEANING

A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in “Section 09 91 00 - Painting”

3.8 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood blocking, nailers, furring and grounds.
   2. Utility shelving.
   3. Plywood backing panels

B. Related Sections:
   1. Section 06 16 00 - Sheathing.
   2. Section 06 40 23 - Interior Architectural Woodwork: Wood blocking for architectural woodwork.

1.2 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NLGA: National Lumber Grades Authority.
   3. RIS: Redwood Inspection Service.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
   3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
   4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:
1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Power-driven fasteners.
5. Powder-actuated fasteners.
6. Expansion anchors.
7. Metal framing anchors.

1.5 QUALITY ASSURANCE

A. 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.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less, unless otherwise indicated.

C. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show 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.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, 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 and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
   4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
   5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
   3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
   4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
   1. Plywood Backing Panels: Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:
1. Framing for raised platforms.
2. Concealed blocking.
3. Framing for non-load-bearing partitions.
4. Roof construction.
5. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Furring.
5. Grounds.
6. Utility shelving.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any the following species:
1. Hem-fir (north); NLGA.
2. Mixed southern pine; SPIB.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.
5. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
6. Western woods; WCLIB or WWPA.
7. Northern species; NLGA.
8. Eastern softwoods; NeLMA.

C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:
1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine or southern pine; No. 2 grade; SPIB.
3. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
4. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north); Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods; No. 2 Common grade; NeLMA.
5. Northern species; No. 2 Common grade; NLGA.
6. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS (If required)

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exterior, AC, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 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, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153 or Type 304 stainless steel].

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME 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.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

H. Stainless-Steel Sheet: ASTM A 666, Type 304.
1. Use for exterior locations and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

C. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
   1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
   1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-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. Remove temporary grounds when no longer required.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal-size furring at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal-size furring vertically at 16 inches o.c.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 16 00

SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall sheathing.
   2. Roof sheathing.
   3. Sheathing joint and penetration treatment.

B. Related Requirements:
   1. Section 06 10 00 - Rough Carpentry: Blocking, nailers, furring, sleepers and backing panels.
   2. Section 07 27 23 - Gypsum Board Air Barriers: Gypsum sheathing system with integral air barrier.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
   3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
   4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For following products, from ICC-ES:
   1. Preservative-treated plywood.
   2. Fire-retardant-treated plywood.

1.4 QUALITY ASSURANCE

A. 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. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or GA-600, "Fire Resistance Design Manual."

2.2 WOOD PANEL PRODUCTS

A. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.
   a. For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings, and the following:
1. Roof and wall sheathing within 48 inches of fire/party walls.
2. Roof sheathing.

2.5 WALL SHEATHING

A. Plywood Wall Sheathing (If required): Exterior, Structural I or Exterior sheathing.
1. Span Rating: Not less than 24/0.
2. Nominal Thickness: Not less than ¾ inch..

B. Glass-Mat Gypsum Wall Sheathing with Integral Air Barrier: Refer to "Section 07 27 23 - Gypsum Board Air Barriers."

C. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Corporation; **"GlasRoc"**
   b. G-P Gypsum Corporation; **"Dens-Glass Gold.**
   c. LaFarge North America Inc.; **"Weather Defense Platinum"**
   d. National Gypsum Company; **"Gold Bond e(2)XP"**
   e. Temple-Inland Inc.; **"GreenGlass"**
   f. United States Gypsum Co.; **"Securock"**
2. Type and Thickness: Type X, 5/8 inch thick.
3. Size: 48 by 96 inches, unless otherwise indicated.

2.6 ROOF SHEATHING

A. Plywood Roof Sheathing: AB Marine Plywood sheathing.
1. Span Rating: Not less than 24/0.
2. Nominal Thickness: Not less than ¾ inch.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
   1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
   1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
   2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.8 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
   1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

2.9 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01or ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
   1. Adhesives, sealants, and primers shall comply with VOC limits listed in SCAQMD Rule #1168.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Wood Framing: Use hot-dip galvanized nails or screws. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:
1. Wall and Roof Sheathing:
a. Nail or screw to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch apart at edges and ends.

3.3 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.
a. Sheathing Tape for Foam-Plastic Sheathing (If required): Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

END OF SECTION

SECTION 06 40 23

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cabinet hardware.
2. Interior wood paneling; stained finish.
3. Interior wood base & trim; stained finish.
4. Interior standing and running trim; opaque finish.
5. Wood cabinets for stained finish.
6. Laminate-clad cabinets.
7. Plastic-laminate countertops.
8. Solid-surfacing-material countertops.
9. Closet and utility shelving.
10. Shop finishing of interior woodwork

B. Related Sections:
1. Section 05 50 00 - Metal Fabrications: Metal countertop supports.
2. Section 06 10 00 - Rough Carpentry: Wood furring, blocking, shims, and hanging strips required for installing wood frames.
3. Section 07 92 00 - Joint Sealants: Sealant used to caulk space between backsplash and wall.
4. Section 08 21 1 - Flush Wood Doors: Doors specified by reference to architectural woodwork standards.
5. Section 09 91 00 - Painting: Field-applied finishes for architectural woodwork.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including cabinet hardware and accessories and finishing materials and processes.

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 for electrical switches and outlets and other items installed in architectural wood cabinets.
4. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

C. Samples for Initial Selection:
1. Shop-applied transparent finishes.

2. Solid-surface material.

D. Samples for Verification:
1. Lumber and panel products for stained finish, for each species and cut, finished on one side and one edge.
2. Laminate-clad panel products, 8 by 10 inches, for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
3. Thermoset decorative-overlay surfaced panel products, 8” x 10”, for each type, color, pattern, and surface finish, with separate samples of unfaced panel product used for core.
4. Solid-surface material.
5. Corner pieces as follows:
   a. Cabinet front frame joints between stiles and rail, as well as exposed end pieces, 18 inches high by 18 inches wide by 6 inches deep.
6. Exposed cabinet hardware, one unit for each type and finish

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Product Certificates: For each type of product.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

B. Installer Qualifications: Fabricator of products.

C. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Institute’s (AWI) "Architectural Woodwork Standards" for grades of architectural woodwork indicated for construction, finishes, installation, and other requirements.

D. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers and wood doors with face veneers that are sequence matched with woodwork and transparent-finished wood doors that are required to be of same species as woodwork.

E. Fire-Test-Response Characteristics: Where fire-retardant materials or products are indicated, provide materials and products with specified fire-test-response characteristics as determined by testing identical products per test method indicated by UL, ITS, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify with appropriate markings of applicable testing and inspecting agency in the form of separable paper label or, where required by authorities having jurisdiction, imprint on surfaces of materials that will be concealed from view after installation.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups of wood paneling.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect woodwork during transit, delivery, storage, and handling to prevent damage, soilage, and deterioration.

B. Do not deliver woodwork until painting and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas.

C. Store items at project site in installation spaces where possible. If woodwork must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Field Conditions" Article

1.7 FIELD CONDITIONS

A. Weather Limitations for Exterior Work: Proceed with installation of exterior wood frames only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet-work is completed, and HVAC system is operational and reasonable construction conditions exist as not to affect the performance or warranty of the architectural woodwork.

C. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate field measurements before being enclosed. Record measurements on final shop drawings.
2. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site and coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

D. Established Dimensions: Where wood frames are indicated to fit to other construction, establish dimensions for areas where wood frames are to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 INTERIOR ARCHITECTURAL WOODWORK, GENERAL

A. Quality Standard: Unless otherwise indicated, comply with the AWI "Architectural Woodwork Standards" for grades of architectural wood and plastic laminate cabinets and wood trim indicated for construction, finishes, installation, and other requirements.

2.2 MATERIALS

A. Wood Species for Opaque Finish: FAS1F grade, kiln dried Poplar.

B. Wood Species for Stained Finish: **Plain-sliced Walnut** to match Architect's control sample.

C. Wood Products:
1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2.
3. Particleboard: Not permitted.
4. Softwood Plywood: PS 1.
5. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1, made with adhesive containing no urea formaldehyde.

D. Formaldehyde Emission Level for Medium-Density Fiberboard: Comply with requirements of NPA 9.

E. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
a. Formica Corporation.
b. Nevamar Corp.
c. Ralph Wilson Plastics Co.

G. Adhesive for Bonding Plastic Laminate: Contact cement.

H. Thermoset Decorative Overlay: Decorative surface of thermally fused polyester or melamine-impregnated web, bonded to specified substrate and complying with ALA 1992.
1. Substrate: Medium-density particleboard.

I. Solid Surface Material: Solid, nonporous, homogeneous surfacing material, composed of PMMA and natural minerals. The minerals are composed of aluminum trihydrate.

2.3 CABINET HARDWARE AND ACCESSORY MATERIALS

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in "Section 08 71 00 - Door Hardware."

B. Cabinet Hardware Items: Provide the following items as indicated or required for architectural cabinets. Provide the named product or an Architect-approved equivalent.
1. Cabinet and Drawer Pulls: As indicated on Drawings.
2. Hinges: Blum #95 M 3580.
3. Drawer Slides (Drawers 24" wide or less):

a. Basis-of-Design: Accuride #7434, all ball bearing, rail mount, full extension plus or minus 1" over travel slides, hold-in detent, 100 lb/pr load rating, and progressive movement, with zinc finish.
   1) Approved Substitutions:
      a) Hettich 4932
      b) Hafele 422.29
      c) Knape & Vogt 8505 (with handle drawers up to 30" w)

4. Drawer Slides (Drawers 42" wide or less):
   a. Basis-of-Design: Accuride #3640, all ball bearing, rail/bracket mount, full extension plus or minus 1" over travel slides, hold-in detent, 200 lb/pr load rating, and sequential movement, with zinc finish.
      1) Approved Substitutions:
         a) Hettich 3320 (up to 500 lbs.)
         b) Hafele 422.07
         c) Knape & Vogt 8520 (up to 150 lbs.)
5. Lock/Cylinder: Best #1E74 x C208.
6. Surface Bolts: Ives #40B26-3".
7. Grommets: 3 5/8inch OD molded-plastic; with 3 inch hole and plastic cap with slot for wire passage; Hafele or equal.
   a. Color: Selected by Architect from manufacturer's full range.
8. Catches: Magnetic catches, BHMA A156.9, B03141.
9. Keyboard Tray (if required): Accuride CBERGO-TRAY300.

C. Exposed Hardware Finishes: Provide finish that matches Door Hardware unless otherwise noted.

D. Concealed Hardware: Provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.
   1. For metal framing supports, provide screws as recommended by metal-framing manufacturer.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

D. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed steel or lead expansion bolt devices for drilled-in-place anchors.

2.5 FABRICATION, GENERAL

A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

1. Interior Woodwork Grade: Custom Grade.
2. Shop cut openings to maximum extent possible.
3. Sand edges of cutouts to remove splinters and burrs.
4. Seal edges of openings in countertops with a coat of varnish.

B. Interior Standing and Running Trim:
1. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. Assemble casings in plant except where limitations of access to place of installation require field assembly.

D. Fabricate wood frames to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Edges of Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.

E. Stained Wood Paneling:
1. Arrange paneling in shop or other suitable space in proposed sequence for examination by Architect. Mark units with temporary sequence numbers to indicate position in proposed layout.
   a. Lay out one elevation at a time if approved by Architect.
   b. Notify Architect seven (7) days in advance of the date and time when layout will be available for viewing.
   c. Provide lighting of similar type and level as that of final installation for viewing layout unless otherwise approved by Architect.
   d. Rearrange paneling as directed by Architect until layout is approved.

F. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to relative humidity conditions existing during time of fabrication and in installation areas.

G. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
1. Corners of cabinets and edges of solid-wood (lumber) members 3/4 inch thick or less: 1/16 inch.
2. Edges of rails and similar members more than 3/4 inch thick: 1/8 inch.

H. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

I. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

2.6 WOOD PANELING FOR TRANSPARENT FINISH

A. Grade: **Custom Grade.**

B. Wood Species: **Plain-sliced Walnut** to match Architect's control sample.

C. Panels: Flush wood panels made from edge-glued solid lumber.

D. Shop assemble paneling into largest units practical for delivery and installation. Provide shop-prepared detachable joints for necessary field connections. Sand and pull joints tight in shop so field joints will comply with joint tolerances for specified grade. Unless otherwise indicated, provide continuous mortise-and-tenon joints between panel units and provide removable temporary protection for joints during handling and delivery.

2.7 INTERIOR STANDING AND RUNNING TRIM FOR TRANSPARENT FINISH

A. Grade: **Custom Grade**.

B. Wood Species: **Plain-sliced Walnut** to match Architect's control sample.

C. For rails wider or thicker than available lumber, use veneered construction. Do not glue for width or thickness.

D. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

E. Assemble casings in plant except where limitations of access to place of installation require field assembly.

F. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.8 WOOD CABINETS FOR TRANSPARENT FINISH

A. Grade: **Custom Grade.**

B. AWI Type of Cabinet Construction: Flush Overlay, unless otherwise indicated.

C. Reveal Dimension: As indicated.

D. Wood Species and Cut for Exposed Surfaces: **Plain-sliced Walnut** to match Architect's control sample.
1. Grain Direction: Vertically for drawer fronts, doors, and fixed panels.
2. Matching of Veneer Leaves: Book match.
3. Vertical Matching of Veneer Leaves: End match.
4. Veneer Matching within Panel Face: Center-balance match.
5. Veneer Matching within Room: Provide cabinet veneers in each room or other space from a single flitch with doors, drawer fronts, and other surfaces matched in a sequenced set with continuous match where veneers are interrupted perpendicular to the grain.
6. Comply with veneer and other matching requirements indicated for blueprint-matched paneling.

E. Semi-Exposed Surfaces:
1. Surfaces Other Than Drawer Bodies: Compatible species to that indicated for exposed surfaces, stained to match.
2. Drawer Sides and Backs: Solid-hardwood lumber, stained to match species indicated for exposed surfaces.
3. Drawer Bottoms: Hardwood plywood.

F. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.9 LAMINATE-CLAD CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate-clad cabinets.
   1. Grade: **Custom Grade.**

B. AWI Type of Cabinet Construction: Flush Overlay unless otherwise indicated.

C. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
   1. Horizontal Surfaces Other than Tops: HGS.
   2. Postformed Surfaces: HGP.
   3. Vertical Surfaces: HGS.
   4. Edges: HGS.

D. Materials for Semi-exposed Surfaces:
   1. Surfaces Other than Drawer Bodies: Thermoset decorative overlay.
   2. Drawer Sides and Backs: Thermoset decorative overlay.
   3. Drawer Bottoms: Thermoset decorative overlay.

E. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL.

F. Colors, Patterns, and Finishes: Provide materials and products as indicated on the Drawings.

2.10 LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for countertops.
   1. Grade: Custom.

B. Type of Top: High-pressure decorative laminate complying with the following:
   1. Grade: HGS.
      a. Colors, Patterns, and Finishes: Provide materials and products as indicated on the Drawings.
   2. Edge Treatment: Same as laminate cladding on horizontal surfaces.
   3. Core Material: Exterior-grade plywood.

2.11 SOLID-SURFACING-MATERIAL

A. Grade: **Custom Grade**

B. Solid-Surfacing-Material Thickness: As indicated on Drawings.

C. Colors, Patterns, and Finishes: Provide materials and products as indicated on the Finish Schedule that result in colors of solid-surfacing material complying with the following requirements:
   1. Match Architect's sample.

D. Fabricate sills in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

2.12 CLOSET AND UTILITY SHELVING (If Required)

A. Grade: **Custom Grade**.

B. Shelf Material: 3/4-inch solid lumber.

C. Cleats: 3/4-inch solid lumber.

D. Wood Species: Any closed-grain hardwood.

2.13 SHOP FINISHING FOR STAINED WOODWORK

A. Stained Finish: Finish architectural woodwork to receive stained finish at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.

C. Transparent Finish:
1. Grade: AWI **Premium grade**.
2. AWI Finish System: Conversion Varnish or Catalyzed Polyurethane.
3. Staining: As indicated on Finish Schedule and to match Architect's sample.
4. Wash Coat for Stained Finish: Apply a wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
5. Filled Finish for Open-Grain Woods (If applicable): After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
   a. Apply wash-coat sealer after staining and before filling.
6. Sheen: Comply with ASTM D 523; match Architect's samples.

2.14 FIELD FINISHING FOR OPAQUE WOODWORK

A. Opaque Field Finish: Paint architectural woodwork according to "Section 09 91 00 - Painting."
1. Colors and Sheen: As indicated on Drawings and in "Section 09 91 00 - Painting."

B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including back priming and removal of packing.

3.2 INSTALLATION

A. Quality Standard for Installation: Install woodwork to comply with applicable provisions of the AWI "Architectural Woodwork Standards" for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches for plumb and level (including tops).

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible.
   1. Scarf running joints and stagger in adjacent and related members.
   2. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.

F. Cabinets: Install without distortion so that 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 the installation of hardware and accessory items as indicated.
   1. Install countertops with no more than 1/8” in 96” sag, bow, or other variation from a straight line.
   2. Cabinet Hardware: Finish cabinets prior to installation of cabinet hardware.

G. Wood Paneling:
   1. Grade: Install paneling to comply with same grade as paneling to be installed.
   2. Install paneling level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.
   3. Scribe and cut paneling to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
   4. Anchor paneling to supporting substrate with concealed panel-hanger clips or blind nailing. Do not use face fastening unless covered by trim.
   5. Complete finishing work specified in this Section to extent not completed at shop or before installation of paneling. Fill nail holes with matching filler where exposed.
      a. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.

H. Countertops: Anchor securely to base units and other support systems as indicated. Caulk space between backsplash and wall with specified sealant.
   1. Install countertops with no more than 1/8” in 96” sag, bow, or other variation from a straight line.
   2. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork 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 woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

3.4 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to fabricator and Installer that ensures that woodwork is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 07 14 16

COLD FLUID-APPLIED WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Cold fluid-applied polyurethane waterproofing system at vertical surfaces of building foundation walls.

B. Related Requirements:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 07 21 00 – Thermal Insulation

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review waterproofing requirements including, but not limited to, the following:
a. Surface preparation specified in other Sections.
b. Minimum curing period.
c. Forecasted weather conditions.
d. Special details and sheet flashings.
e. Repairs.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Samples: For each exposed product and for each color and texture specified, including the following products:
1. Flashing sheet, 8 by 8 inches.
2. Membrane-reinforcing fabric, 8 by 8 inches.
3. Insulation, 8 by 8 inches.
4. Drainage panel, 4 by 4 inches.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to set quality standards for installation.
   1. Build mockup for each typical waterproofing installation including accessories to demonstrate surface preparation, crack and joint treatments, inside and outside corner treatments, and protection.
      a. Size: 20 sq. ft. in area.
      b. Description: Each type of wall installation.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.
   1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
   2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.7 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.

2.2 SINGLE-COMPONENT POLYURETHANE WATERPROOFING

A. Single-Component, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. W.R. Meadows Hydralastic 836
      b. Carlisle Coatings & Waterproofing Inc; MiraSEAL.
      c. Tremco Incorporated; Tremproof 201/60, TREMproof 250 GC

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.

B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated acrylic latex, polyurethane, or epoxy.

C. Sheet Flashing: 50-mil- minimum, nonstaining, uncured sheet neoprene.
1. Adhesive: Manufacturer's recommended contact adhesive.

D. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.

E. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; ASTM C 920, Type M, Class 25 or greater; Grade NS for sloping and vertical applications and Grade P for deck applications; Use NT exposure; and as recommended by manufacturer for substrate and joint conditions.
1. Backer Rod: Closed-cell polyethylene foam.

2.4 PROTECTION COURSE

A. Protection Course: Extruded-polystyrene board insulation with continuous surface skins on both faces intact, unfaced; ASTM C 578, Type X, 1/2 inch thick.

~~2.5 MOLDED-SHEET DRAINAGE PANELS~~

~~A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core and a polymeric film bonded to the other side; with a vertical flow rate of 9 to 18 gpm per ft..~~
~~1. Products: Subject to compliance with requirements, provide the following:~~
~~a. American Hydrotech, Inc; Hydrodrain 400~~
~~b. Carlisle Coatings & Waterproofing; CCW MiraDRAIN 6200 or CCW MiraDRAIN 6200XL.~~
~~c. Grace Construction Products; W.R. Grace & Co. - Conn; Hydroduct 220 or Hydroduct 660.~~
~~d. Insulation Solutions, Inc; AquaCheck DB 1500 or AquaCheck DB 2500.~~
~~e. Liquid Plastics Inc; Deco-Drain 42.~~
~~f. Polyguard Products, Inc; Polyguard Flow 10-HV, Polyguard Flow 10-P, Polyguard Flow 15-P, or Polyguard Flow 30-H.~~
~~g. Urethane Polymers International, Inc; EZE-DRAIN V-2.~~

2.6 INSULATION

A. Board Insulation: Extruded-polystyrene board insulation complying with ASTM C 578, square or shiplap edged.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. DiversiFoam Products.
b. Dow Chemical Company (The).
c. Owens Corning Insulating Systems LLC.
d. Pactiv Building Products.
e. T. Clear Corporation, a subsidiary of Fin Pan Inc.
f. Soprema
2. Type VII, 60-psi minimum compressive strength.

~~2.7 INSULATION DRAINAGE PANELS~~

~~A. Unfaced Wall-Insulation Drainage Panels: Extruded-polystyrene board insulation complying with ASTM C 578, Type VI, 40-psi minimum compressive strength; unfaced; fabricated with shiplap or channel edges and with one side having grooved drainage channels.~~

~~1. Products: Subject to compliance with requirements, provide one of the following:~~

~~a. DiversiFoam Products; "CertiFoam 40 (with channel edges) Drainage Board."~~

~~b. Dow Chemical Company (The); "Styrofoam Perimate."~~

~~c. Soprema; "Sopra-XPS-40."~~

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS

A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 1471.

B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 1471. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Comply with ASTM C 1193 for joint-sealant installation.

2. Apply bond breaker on sealant surface, beneath preparation strip.
3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

B. Install sheet flashing and bond to deck and wall substrates where required according to waterproofing manufacturer's written instructions.
1. Extend sheet flashings for 4 inches onto perpendicular surfaces and items penetrating substrate.

3.5 WATERPROOFING APPLICATION

A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C 1471.

B. Start installing waterproofing in presence of manufacturer's technical representative.

C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.

D. Unreinforced Waterproofing Applications: Mix materials and apply waterproofing by spray, roller, notched squeegee, trowel, or other application method suitable to slope of substrate.
1. Apply one or more coats of waterproofing to obtain a seamless membrane free of entrapped gases and pinholes, with a minimum dry film thickness of 60 mils.
2. Apply waterproofing to prepared wall terminations and vertical surfaces.
3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft..

E. Cure waterproofing, taking care to prevent contamination and damage during application and curing.

F. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
1. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.
2. Molded-sheet drainage panels, insulation drainage panels or board insulation may be used in place of a separate protection course for vertical applications when approved in writing by waterproofing manufacturer.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
1. For vertical applications, install board insulation or protection course before installing drainage panels.

3.7 INSULATION INSTALLATION

A. Install one layer of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.

B. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions.

3.8 INSULATION DRAINAGE PANEL INSTALLATION

A. Install drainage panels over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.

B. Ensure that drainage channels are aligned and free of obstructions.

C. On vertical surfaces, set insulation drainage panels in adhesive or tape applied according to manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components and to furnish weekly reports to Architect.

B. If test results or inspections show waterproofing does not comply with requirements, remove and replace or repair the waterproofing as recommended in writing by manufacturer, and make further repairs after retesting and inspecting until waterproofing installation passes.

C. Prepare test and inspection reports.

3.10 PROTECTION

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed board insulation or insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION

SECTION 07 16 16

CRYSTALLINE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Coating: Crystalline waterproofing of new elevator pits and concrete substrates, above-grade or below-grade, on either dry or wet side of substrates where indicated.
2. Admix: Crystalline waterproofing additive to concrete structures as indicated on drawings. The crystalline waterproofing material shall be added to concrete during the mixing cycle, and shall be used in above or below-grade walls and slabs.

B. Related Sections:
1. Section 03 30 00 - Cast-in-Place Concrete.
2. Section 05 50 00 - Metal Fabrications: Elevator pit ladder and sill angles.
3. Section 07 13 26 - Self-Adhering Sheet Waterproofing: Below-grade sheet waterproofing where indicated.
4. Section 14 24 00 - Hydraulic Elevators.

1.2 REFERENCES

A. Reference Standards:
1. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1999.
2. ASTM C 267 - Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacings and Polymer Concretes.
2. ASTM C672 Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
3. ASTM E 329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
4. US Army Corps of Engineers (USACE) CRD-C 48 - Standard Test Method for Water Permeability of Concrete.
5. NSF 61 - Drinking Water System Components - Health Effects; 2000a.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Before installation, conduct a meeting with the waterproofing installer, installers of adjacent work and work penetrating waterproofing, and waterproofing manufacturer's representative to verify project requirements, substrate conditions, manufacturer’s installation instructions, and manufacturer’s warranty requirements

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer’s printed data sheet, for specified products.

B. Manufacturer’s installation instructions.

1.5 INFORMATIONAL SUBMITTALS

A. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.

B. Testing Agency: Independent laboratory meeting the requirements of ASTM E 329 and certified by the United States Bureau of Standards.

C. Manufacturer's Certification: Provide certificates signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification, and that the applicator is qualified and approved to install the materials in accordance with manufacturer's product data.

D. Manufacturer's Field Report: Provide copy of report from manufacturer's representative confirming that the surfaces to which waterproofing material is to be applied are in a condition suitable to receive same.

E. Manufacturer's report on field inspection of substrates, prior to installation.

1.6 CLOSEOUT SUBMITTALS

A. Executed warranties specified herein.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall have no less than ten (10) years experience in manufacturing the cementitious crystalline waterproofing materials for the required work. Manufacturers that cannot provide the performance test data specified herein will not be considered for the project.

B. Applicator Qualifications: Waterproofing applicator shall be experienced in the installation of cementitious crystalline waterproofing materials as demonstrated by previous successful installations, and shall be approved by the manufacturer in writing.

C. Source Limitations: Obtain all crystalline waterproofing products from a single source.

D. Technical Consultation: The waterproofing manufacturer's representative shall provide onsite technical consultation on waterproofing application.

1.8 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements avoid construction delays.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Temperature Conditions: Dry store crystalline waterproofing products at a minimum temperature of 45 degrees F (7 degrees C).

1.9 PROJECT CONDITIONS

A. Coatings:
1. Environmental Requirements/Conditions: Substrate and ambient air temperature shall be within range acceptable to the manufacturer.
2. Comply with manufacturer's product data regarding condition of substrate to receive waterproofing, weather conditions before and during installation, and protection of the installed waterproofing system.

B. Admixture:
1. Reinforcement: All reinforcement shall be rib deformed bar in accordance with applicable standards. Exposed concrete decks (joint free) shall contain sufficient reinforcement to minimize thermal movement and control cracking.
2. Setting Time and Strength: Some retardation of set may occur when using admixture products. The amount of retardation will depend upon the concrete mix design, the particular Admix product used, dosage rate of the Admix, temperature of the concrete and climatic conditions. Concrete containing Admix product may develop higher ultimate strengths than plain concrete. Conduct trial mixes under project conditions to determine setting time and strength of the concrete. Consult with manufacturer or manufacturer's representative regarding concrete mix design, project conditions and proper dosage rate.
3. Weather Conditions: For mixing, transporting and placing concrete under conditions of high temperature or low temperature, follow concrete practices as referred to in ACI 305R-77 (Hot Weather Concreting) and ACI 306R-78 (Cold Weather Concreting). For flatwork being placed in either hot, dry or windy conditions use of monomolecular film (evaporation retardant) is recommended to control loss of bleed water.

1.10 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official
1. Warranty period: Five (5) years commencing on Date of Substantial Completion.

B. Applicator's Warranty: Provide warranty signed by installer that reads as follows:
1. Applicator warrants that, upon completion of the work, surfaces treated with crystalline waterproofing will be and will remain free of water leakage resulting from defective workmanship or materials for a period of Five (5) years from Date of Substantial Completion.
2. In the event that water leakage occurs within the warranty period from such causes, the Applicator shall, at his own expense, repair, replace, or otherwise correct such defective workmanship and materials.
3. Applicator shall not be liable for consequential damages.
4. Applicator's liability shall be limited to repair, replacement, or correction of defective workmanship and materials.
5. This warranty excludes leaks or other defects due to causes beyond the Applicator's control, including but not limited to structural failure, movement of the structure, fire, earthquakes, tornadoes, and hurricanes.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Manufacturer: **XYPEX CHEMICAL CORPORATION**; 13731 Mayfield Place, Richmond, B.C., Canada V6V 2G9; Telephone: (800) 961-4477, (604) 273-5265; Fax: (604) 270-0451; E-mail: info@xypex.com; website: www.xypex.com
   1. Approved Substitutions:
      a. VANDEX.
   2. Other Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.” MATERIALS

2.2 SYSTEM DESCRIPTIONS

A. Cementitious Crystalline Waterproofing Coating: Blend of portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals cause a catalytic reaction which generates a non-soluble crystalline formation of dendritic fibers within the pores and capillary tracts of concrete. This process causes concrete to become permanently sealed against the penetration of liquids from any direction.

A. Crystalline Waterproofing Additive: Concrete waterproofing system shall be of the crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.

2.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Testing Requirements: Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.

B. Independent Laboratory: Testing shall be performed by an independent laboratory meeting the requirements of ASTM E 329-95 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.

C. Crystalline Penetration: Crystallizing capability of waterproofing material shall be evidenced by independent SEM (Scanning Electron Microscope) photographs documenting penetration of crystal-forming waterproofing material to a depth of 2 inches (50 mm).

D. Permeability: Independent testing shall be performed according to U.S. Army Corps of Engineers CRD C48-73 “Permeability of Concrete”.
   1. Concrete samples (treated and untreated) to have design strength of 2000 psi (13.8 MPa) and thickness of 2 inches (50 mm). No admixtures permitted.
   2. Coatings to have maximum thickness of 0.05 inches (1 mm) per coat with up to two coats permitted.
   3. Samples to be pressure tested to 175 psi (405 foot head of water) or 1.2 MPa (123.4 m head of water).
   4. Treated samples, after crystalline growth has occurred, shall exhibit no measurable leakage.

E. Chemical Resistance: Independent testing shall be performed according to ASTM C 267-77 "Chemical Resistance of Mortars" and ASTMC 39-86 "Compressive Strength of Cylindrical Concrete Specimens".
   1. Concrete samples (treated and untreated) to have design strength of 4000 psi (27.6 MPa). No admixtures permitted.
   2. Coatings to have maximum thickness of 0.05 inches (1 mm) per coat with up to two coats permitted.
   3. Untreated and treated specimens to be immersed for a minimum of 84 days in following chemical solutions: hydrochloric acid (3.5pH), brake fluid, transformer oil, ethylene glycol, toluene, caustic soda.
   4. Treated specimens shall exhibit no detrimental effects after exposure, and shall have a minimum of 14% increase in compressive strength versus untreated control specimens.

F. Potable Water Approval: Independent testing shall be performed according to NSF Standard 61 and approval for use of waterproofing material on structures holding potable water shall be evidenced by NSF certification.

2.4 MATERIALS (COATINGS)

A. Crystalline Waterproofing Coating Materials:
   1. **Xypex Concentrate**
   2. **Xypex Modified**
   3. **Xypex Patch'n Plug**

2.5 MATERIALS (ADMIXTURE)

A. Crystalline Waterproofing Admixture Materials:
   1. **Xypex Admix C-500**
   2. **Xypex Admix C-1000**
   3. **Xypex Admix C-2000**

2.6 MIXES (COATINGS)

A. General: Mix waterproofing material by volume with clean water which is free from salt and deleterious materials. Mix waterproofing material in quantities that can be applied within 20 to 30 minutes from time of mixing. As mixture thickens, stir frequently, but do not add additional water. Do not mix bonding agents or admixtures with crystalline waterproofing materials.

B. Brush Application Mix: Measure dry powder and place in mixing container. Measure water and mix into the dry powder with a paddle on a slow speed electric drill (250 RPM) or other type mixer which is acceptable to manufacturer. Mixing proportions shall be as follows:

Coverage	**Proportions (by Volume)**
1.5 lb./sq. yd. (0.8 kg/m2)	5 powder to 2 water
2.0 lb./sq. yd. (1.0 kg/m2)	3 powder to 1 water

C. Spray Application Mix: Mixing shall be same as specified for brush application except that mixture shall be thinner. Use following proportions as a guide only. Adjust proportions to match type of spray equipment and pressures used. Mixing proportions shall be as follows:

Coverage	**Proportions (by Volume)**

1.5 lb./sq. yd. (0.8 kg/m2) 5 powder to 3 water

D. Dry-Pac Mix: Using a trowel, mix 1 part clean water with 6 parts Xypex Concentrate powder for 10 to 15 seconds. It is acceptable that lumps may be present in mixture. Mix only as much as can be applied in 15 minutes

2.7 MIXING (ADMIXTURE)

A. Dosage:
1. General: Xypex Admix must be added to concrete mix at time of batching.
2. Dosage Rate: Under normal conditions, the crystalline waterproofing powder shall be added to the concrete mix at the following rates:
a. **Xypex Admix C-500:** 2% – 3% by weight of portland cement content
b. **Xypex Admix C-1000:** 2% – 3% by weight of portland cement content
c. **Xypex Admix C-2000:** 2% by weight of portland cement content
d. **Xypex Admix NF (no fines grade):** 1 – 1.5% by weight of portland cement content

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

B. Obtain waterproofing manufacturer's approval of substrates; submit field inspection report.

C. Do not install unless substrate and ambient air temperature are within range acceptable to waterproofing manufacturer.

3.2 PREPARATION (COATINGS)

A. Concrete Finish: Concrete surfaces to receive waterproofing treatment shall have an open capillary system to provide tooth and suction, and shall be free from scale, excess form oil, laitance, curing compounds and foreign matter. Horizontal surfaces shall have a rough wood float or broom finish. Where a smooth trowel finish is required on horizontal surface, crystalline waterproofing material shall be applied by dry shake method at time of concrete finishing in accordance with manufacturer's product data.

B. Surface Preparation: Smooth surfaces (e.g. where steel forms are used) or surfaces covered with excess form oil or other contaminants shall be washed, lightly sand-blasted, water-blasted, or acid etched with muriatic acid as necessary to provide a clean absorbent surface. Surfaces to be acid-etched shall be saturated with water prior to application of acid.

C. Repair of Defects: Surface defects shall be repaired in accordance with manufacturer's instructions as follows:
1. Form Tie Holes, Construction Joints, Cracks: Chip out defective areas in a "U" shaped slot one inch (25 mm) wide and a minimum of one inch (25 mm) deep. Clean slot of debris and dust. Soak area with water and remove excess surface water. Apply a slurry coat of Xypex Concentrate at the rate of 1.5 lb./sq. yd. (0.8 kg/m2) to the slot. Allow slurry to reach an initial set, then fill cavity with Dry-Pac. Compress tightly into cavity using pneumatic packer or block and hammer.
2. Rock Pockets, Honeycombing or Other Defective Concrete: Rout out defective areas to sound concrete. Remove loose materials and saturate with water. Remove excess surface water and

apply a slurry coat of Xypex Concentrate to area. After slurry has set, but while still "green", fill cavity to surface level with non-shrink grout.

D. Wetting Concrete: Prior to application of waterproofing treatment, thoroughly saturate concrete surfaces with clean water as required to ensure migration of crystalline chemicals into voids and capillary tracts of the concrete. Remove free surface water before application.

3.3 APPLICATION (COATINGS)

A. Construction Joints: Apply Xypex Concentrate in slurry form at a rate of 2.0 lb./sq. yd. (1.08 kg/m^2) to joint surfaces between concrete pours. Moisten surfaces prior to slurry application. Where joint surfaces are not accessible prior to pouring new concrete, consult manufacturer for application procedure.

B. Sealing Strips and Coves: Prepare concrete surfaces that will come into contact with sealing strips and coves by applying one coat of Xypex Concentrate in slurry form at a rate of 1.5 lb./sq. yd. (0.8 kg/m^2). Then apply Xypex Concentrate in Dry-Pac form (sealing strip) or Xypex Modified in mortar consistency (cove) after slurry coat has reached an initial set but is still "green".
   1. Sealing Strips: Where indicated on drawings, fill preformed grooves, one inch (25 mm) wide and minimum of 1.5 inch (37 mm) deep, located at construction joints with Xypex Concentrate in Dry-Pac form. Compact Dry-Pac tightly into groove using a pneumatic packer or hammer and block.
   2. Coves: Where indicated on drawings, trowel apply and pack Xypex Modified mortar into a cove shape.

C. Surface Application: After repairs, surface preparation, treatment of construction joints and sealing strip placement have been completed in accordance with manufacturer's product data and as specified herein, apply Xypex treatment uniformly to concrete surfaces with semi-stiff bristle brush or broom, or suitable spray equipment. Application rates and locations shall be as indicated in the drawings and in accordance with manufacturer's product data. When brushing, work slurry well into surface of the concrete, filling surface pores and hairline cracks. When spraying, hold nozzle close enough to ensure that slurry is forced into pores and hairline cracks.
   1. First Coat (of one or two coat application): Apply Xypex Concentrate slurry coat to locations indicated on drawings in accordance with manufacturer's product data.
   2. Second Coat (of two coat application): Where indicated on drawings or as required by manufacturer's product data, apply Xypex Modified slurry coat while first coat of Xypex Concentrate is still "green" but after it has reached an initial set. Use light prewatering between coats when rapid drying conditions exist.

D. Sandwich (Topping) Application: When treated structural slabs are to receive a concrete or other topping, place the topping while waterproofing material is still "green" but has reached an initial set. Lightly prewater when rapid drying conditions exist.

3.4 CURING (COATINGS)

A. General: Begin curing as soon as Xypex coating has hardened sufficiently so as not to be damaged by a fine spray. Cure Xypex treatment with a mist fog spray of clean water three times a day for 2 to 3 days, or cover treated surfaces with damp burlap for the prescribed period. In warm climates, more than three sprayings per day may be necessary to prevent excessive drying of coating.

B. Air Circulation: Do not lay plastic sheeting directly on the waterproofing coating as air contact is required for proper curing. If poor circulation exists in treated areas, it may be necessary to provide fans or blown air to aid in curing of waterproofing treatment.

C. Holding Structures: For concrete holding structures such as swimming pools, reservoirs, water treatment tanks and wet wells, cure Xypex treatment for three days and then allow treatment to set (air cure) for 12 days before filling structure with liquid. For structures holding hot or corrosive liquids, cure waterproofing treatment for three days and allow to set for 18 days before filling.

D. Protection: During the curing period, protect treated surfaces from damage by wind, sun, rain and temperatures below 36oF (2oC). If plastic sheeting is used for protection, it must be raised off of waterproofing coating to allow sufficient air circulation.

E. Curing Agent: If moist curing is not possible, use a chemical curing agent that is specifically designed for or compatible with the approved crystalline waterproofing treatment. Curing agent shall have at least two years of successful field use and shall be approved by waterproofing manufacturer in writing.

3.5 APPLICATION (ADMIXTURE)

A. General: Xypex Admix shall be added to the concrete mix at time of batching. Thorough blending of the Xypex Admix throughout the concrete mix is essential for correct performance of the product and, therefore, care should be taken to ensure that a homogeneous mixture is obtained.

B. Concrete Batching & Mixing: Procedures for mixing will vary according to type of batch plant operation and equipment.
   1. Ready Mix Plant - Dry Batching Operation: Add Xypex Admix powder to drum of ready-mix truck, then add 60% - 70% of required water along with 300 - 500 lb. (136 - 227 kg) of aggregate. Mix the materials for 2 - 3 minutes to ensure that the Admix is distributed evenly throughout the mix water. Add balance of materials to the ready-mix truck and mix in accordance with standard batch practices.
   2. Ready Mix Plant - Central Mix Operation: Mix Xypex Admix with water to form a very thin slurry (e.g. 15 - 20 lb. or 6.75 - 9 kg of powder mixed with 3 gallons or 13.6 litres of water). Pour the required amount of material in drum of ready-mix truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with standard practices (taking into account the quantity of water that has already been placed in the ready-mix truck). Pour the concrete into the truck and mix for at least 5 minutes to ensure even distribution of the Xypex Admix throughout the concrete.
   3. Precast Batch Plant - Pan Type Mixer: Add Xypex Admix to the rock and sand, then mix thoroughly for 2 - 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

C. Curing: Concrete containing Xypex Admix shall be moist cured in accordance with ACI Reference 308, "Standard Practice for Curing Concrete."

3.6 INTERFACE WITH OTHER MATERIALS

A. Backfilling: Do not backfill for 36 hours after application. If backfill takes place within seven days after application, then backfill material shall be moist so as not to draw moisture from waterproof coating.

B. Paint, Epoxy or Similar Coatings: Do not apply paint or other coatings until waterproofing treatment has cured and set for a minimum of 21 days. Before applying paint or coating, neutralize treated surface by dampening with water and then washing waterproofed surface with 15% muriatic acid, diluted in a ratio of one part acid to four parts water by volume. Flush acid off treated concrete surfaces.

C. Grout, Cement Parge Coat, Plaster or Stucco: Because the waterproof coating forms a relatively smooth surface and the resulting crystalline formation fills the concrete pores thereby reducing suction characteristics of the concrete, it may be necessary to use a suitable bonding agent for proper bonding of cementitious systems. Trial applications are recommended to ensure that adhesion requirements are satisfied.

D. Responsibility to Ensure Compatibility: Xypex Chemical Corporation makes no representations or warranties regarding compatibility of Xypex treatment with coatings, plasters, stuccos, tiles or other surface-applied materials. It shall be the responsibility of the installer of the surface-applied material that is to be applied over the Xypex waterproofing treatment, to take whatever measures are necessary, including testing, to ensure acceptance by or adhesion to the waterproofing treatment.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.
   1. Concrete shall be examined for structural defects such as faulty construction joints, cold joints and cracks. Such defects to be repaired in accordance with manufacturer's repair procedures.

B. Examination for Defects: Do not conceal installed waterproofing system before it has been observed by Architect/Engineer, waterproofing manufacturer's representative and other designated entities.
   1. Concrete shall be examined for structural defects such as faulty construction joints, cold joints and cracks. Such defects to be repaired in accordance with manufacturer's repair procedures.

C. Flood Testing: Flood test areas that are capable of holding water after end of curing period.
   1. Perform flood test on completed waterproofing installation before placement of other construction.
   2. Plug or dam drains and fill area with water to a depth of two inches (50 mm) or to within 0.5 inch (12.5 mm) of top of waterproofing treatment.
   3. Let water stand for 24 hours.
   4. If leaks are discovered, make repairs and repeat test until no leaks are observed.

3.8 CLEANING AND PROTECTION

A. Clean spillage and overspray from adjacent surfaces using appropriate cleaning agents and procedures.

B. Protect installed product from damage during construction; do not allow traffic on unprotected waterproofed surfaces.

C. Do not backfill against waterproofed surfaces for at least 36 hours after installation; use moist backfill material when backfilling occurs less than 7 days after installation.

D. Do not apply paint or other coatings for at least 21 days; before applying coatings neutralize waterproofed surface as recommended by waterproofing manufacturer.

END OF SECTION

SECTION 07 19 00

WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Penetrating water-repellent treatments for the following vertical and horizontal surfaces:
   1. Exterior clay face brick.
   2. Limestone units.
   3. Precast architectural concrete units.

B. Related Sections:
   1. Section 03 45 00 - Precast Architectural Concrete: Precast architectural concrete units to receive water repellents.
   2. Section 04 20 00 - Unit Masonry: Exterior face brick to receive water repellents.
   3. Section 04 43 13 - Limestone: Limestone units to receive water repellents.

1.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Products shall comply with State and local regulations concerning AIM (Architectural, Industrial and Maintenance) coatings regarding Volatile Organic Content (VOC).
   1. The use of 1,1,1 trichloroethane shall not be allowed.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Include manufacturer's printed statement of VOC content.
   2. Manufacturer’s installation instructions.
   3. Include manufacturer's recommended number of coats for each type of substrate and spreading rate for each separate coat.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Applicator.

B. Product Certificates: For each type of water repellent, from manufacturer.

C. Statement of compliance with Regulatory Requirements.

D. Preconstruction Testing Reports: For water-repellent-treated substrates.

E. Warranty: Special warranty specified in this Section.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualification: Not less than five (5) years experience in the actual production of specified products.

B. Applicator Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, plus the following:
   1. Acceptable to or licensed by manufacturer.
   2. Not less than three (3) years experience with systems.
   3. Successfully completed not less than five (5) comparable scale projects using this system.

1.7 PRE-INSTALLATION TESTING

A. Notify Architect at least one week in advance of the dates and times when assemblies will be tested.

B. Spray Test: After water repellent has dried, spray coated surfaces with water.
   1. After surfaces have adequately dried, recoat surfaces that show water absorption.

C. Manufacturer's Field Services:
   1. Furnish written certification that surface preparation method and final condition has manufacturer's approval and comply with the warranty.
   2. Test Area: Furnish results of test area absorption on each type of substrate. Test results shall determine application rate.

D. Mock-Up (Test Area): Perform the following field evaluations before water repellent application. The cost of the field testing shall be the responsibility of the Water Repellent Manufacturer.
   1. Prepare a minimum three feet by three feet area to be sprayed with the water repellent. The area will be determined by the Owner. Apply the water repellent in a flooding application, from the bottom up to cause the material to run down 6 to 8 inches below the spray pattern.
   2. After allowing five days for the sample to cure run a RILEM uptake test on the treated area.
   3. Place one tube on the brick and one tube on a mortar joint. Owner must be present for the application of the water repellent and the test.
   4. Acceptable minimum results are as stated in the warranty provisions. Coverage rate used to pass this test section must be used on entire project.

1.8 DELIVERY STORAGE AND HANDLING

A. Packing and Shipping: Deliver products in original unopened packaging with legible manufacturer's identification.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.9 FIELD CONDITIONS

A. Environmental Requirements:
   1. Maintain ambient temperature above 20 degrees F during and 24 hours after installation.
   2. Do not proceed with application on materials if ice or frost is covering the substrate.
   3. Do not proceed with application if ambient temperature of surface exceeds 100 degree F.
   4. Do not proceed with the application of materials in rainy conditions or if heavy rain is anticipated with 4 hours after application.

5. Do not proceed with the application of materials if windy conditions exist that might cause water repellent to be blown onto vegetation or surfaces not intended to be treated.,

B. Sealer Coordination:
1. Verify compatibility with curing compounds, patching materials, repair mortar, paints, sealants, etc. to be used on masonry surfaces to ensure compatibility with the water repellent.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace materials that fail to maintain water repellency as specified below:
1. Loss of water repellency:
a. Brick Masonry: 1.0 mil/20 minutes or greater (80 mph wind driven rain equivalent).
2. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Basis-of-Design Product/Manufacturer: Clear, silane penetrating water repellent is based on **"Protectosil® CHEM-TRETE BSM 400"** as manufactured by EVONIK DEGUSSA CORPORATION, 379 Interpace Parkway, P.O. Box 677, Parsippany, NJ 07054-0677, (800) 828-0919 www.protectosil.com
1. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Description: Clear, colorless liquid containing pure alkyltrialkoxysilanes.
1. Color: Water white
2. Active Substance: Pure silane
3. Active Content: 100% by weight
4. Solvent: None
5. Flash Point: 145°F
6. Density: 7.3 lb/gal
7. VOC: 383 g/l

C. Performance Characteristics:
1. Water repellents shall comply with the provisions of the following standards for brick masonry:
a. Surface Appearance: No change in the surface appearance or texture.
b. ASTM E514 "Water Permeance of Masonry":
1) 100% reduction in the leakage rate over the control
2) Control wall must have a leakage rate of at least 2.0 liters/hour
c. ASTM C67 "Brick and Structural Clay Tile" Part 7 Water Absorption:
1) 98% reduction in water absorption
d. ASTM G53 "Accelerated Weathering" for 2000 hours:
1) only 5% loss of effectiveness over initial water repellency
e. Penetration: Visual penetration into brick - 0.25 inches average

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements.
2. Inspect for previously applied treatments that may inhibit penetration or performance of water repellents.
3. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
4. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Install coverings to protect adjacent surfaces.

B. Surface Preparation:
1. Verify masonry joints found to be unsound, hollow, or otherwise defective, have been raked out to a depth of 1/2 inch and pointed with mortar.
2. Verify cracks that exceed 1/64 inch wide have been filled with pointing mortar.
3. All repointing shall be completed and allowed to cure.
4. Remove dirt, dust and materials that will interfere with the proper and effective application of the penetrating sealer. It is the responsibility of the Contractor to prepare the surfaces of the concrete as recommended by the Water Repellent Manufacturer and acceptable to the Architect.
5. Sealants, patching materials, and expansion joints shall have been installed and approved by the Architect.

3.3 FIELD QUALITY CONTROL

A. Spray Test: After water repellent has dried, spray coated surfaces with water.
1. After surfaces have adequately dried, recoat surfaces that show water absorption.

B. Manufacturer’s Field Services:
1. Furnish written certification that surface preparation method and final condition has manufacturer’s approval and comply with the warranty.
2. Test Area: Furnish results of test area absorption on each type of substrate. Test results shall determine application rate.

C. Test Area:
1. Before a sealer application the following field evaluation will be done. The cost of the field testing shall be the responsibility of the Water Repellent Manufacturer.
2. Prepare a three feet by three feet area to be sprayed with the water repellent. The area will be determined by the Owner. Apply the water repellent in a flooding application, from the bottom up to cause the material to run down 6 to 8 inches below the spray pattern.
3. After allowing five days for the sample to cure run a RILEM uptake test on the treated area.
4. Place one tube on the brick and one tube on a mortar joint. Owner must be present for the application of the water repellent and the test.
5. Acceptable minimum results are as stated in the warranty provisions. Coverage rate used to pass this test section must be used on entire project.

3.4 APPLICATION

A. Water repellents shall be applied as supplied by the manufacturer without dilution or alteration.

B. Apply with low-pressure (15 psi) airless spray equipment with a fan spray coarse nozzle, flooding the surface to obtain uniform coverage unless otherwise recommended by the manufacturer.

C. Apply at a rate of not less than 125 square feet/gallon unless the field tests determine that a heavier rate of application is necessary to meet the performance requirements.

D. Apply at temperature and weather conditions recommended by the manufacturer or written in this specification.

E. Protect adjoining work, including mortar and sealant bond surfaces, from spillage or blow-over of water repellent in accordance with manufacturer's recommendations.
   1. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live vegetation.
   2. Contractor shall be responsible for replacing all plants, grass or vegetation damaged by the water repellent.

F. Brush-apply water repellent only at locations where overspray would affect adjacent materials and where not practicable for spray application.

G. Coordination with Mortar Joints: Do not apply water repellent until pointing mortar for joints adjacent to surfaces receiving water-repellent treatment has been installed and cured.

H. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.
   1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.5 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses.
   1. Comply with manufacturer's written cleaning instructions.

B. Correct damage to work of other trades caused by water-repellent application, as approved by Architect.

C. Remove protective coverings from adjacent surfaces when no longer needed.

END OF SECTION

SECTION 07 21 29

SPRAYED FOAM INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: **Open cell**, spray-in-place rigid polyurethane foam insulation applied to underside of floor deck to provide an air barrier and improved thermal resistance.

B. Related Sections:
1. Section 09 81 16 - Acoustic Blanket Insulation: Fiberglass sound attenuation insulation for interior partitions.
2. Division 22 - PLUMBING: Plumbing insulation.
3. Division 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC): HVAC Insulation.

1.2 REFERENCES

A. ASTM International (ASTM):
1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
4. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
5. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
6. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
7. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
8. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
9. ASTM E 413 - Classification for Rating Sound Insulation.

B. International Code Council - International Building Code:
1. Section 104.11 Alternative materials, design and methods of construction and equipment.
2. Section 2603 Foam Plastic Insulation.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

1.4 INFORMATIONAL SUBMITTALS

A. Reports: Submit Test Reports verifying qualities of thermal and air barrier wall system components meet or exceed the requirements specified in paragraph 2.2.C of this specification section.

B. Certification: Provide manufacturer’s current Authorized Contractor Certification.

1.5 QUALITY ASSURANCE

A. Spray Polyurethane Foam Installer Qualifications: Spray polyurethane foam installer shall be approved and trained in the application of spray polyurethane foam insulation.

B. Fire Resistance:
1. System complies with NFPA 285: Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components Using the Intermediate-Scale, Multistory Test Apparatus.
2. Fire-stopping measures, per code, shall be included at the floor line in the wall cavity when the wall assembly extends beyond the edge of the floor line.

C. Pre-installation Meeting: Prior to commencement of application of spray polyurethane foam review and document methods and procedures related to installation, including the following:
1. Participants: Authorized representatives of the Contractor, Owner's Representative, Architect, Applicator and Manufacturer.
2. Review governing regulatory requirements, and requirements for insurance and certificates as applicable.

1.6 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in manufacturer's original containers clearly labeled with manufacturer's name, product identification, safety information, net weight of contents and expiration date.

B. Material shall be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.

C. Empty containers shall be removed from site on a daily basis.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Temperature: Install **open-cell**, medium density spray polyurethane foam air barrier within range of ambient and substrate temperatures recommended by air barrier manufacturer. Do not apply air barrier to a damp or wet substrate.

B. Field Conditions: Do not install air barrier in snow, rain, fog, or mist. Do not install air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.

C. Sequencing. Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building.

D. Compatibility. Do not allow closed-cell, medium density spray polyurethane foam to come in contact with chemically incompatible materials.

E. Ultra-violet exposure. Do not expose the air barrier material to sunlight longer than as recommended by the manufacturer (if applicable).

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer shall warrant spray-in-place urethane foam insulation, when installed by certified contractors using factory-trained applicators and applied in accordance to the Product Specification, will perform as stated in the Product Technical Data Sheet.
   1. This warranty is in effect throughout the life of the building provided the original purchaser registers with the Warranty Department of the Manufacturer within thirty days of occupancy.
   2. Manufacturer's sole responsibility under this Limited Lifetime Warranty shall be to repair or replace any defective Product at the cost of the material only.
   3. Manufacturer shall not be responsible for labor cost or any other costs whatsoever related to, or in connection with the removal or installation of either the original or replacement product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: **Open cell** spray polyurethane cellular plastic foam system is based on **"AGRIBALANCE"** as manufactured by **Huntsman Building Solutions,** Arlington, TX; 817-640-4900, https://huntsmanbuildingsolutions.com/
   1. Approved Substitutions:
      a. BASF CORP.
      b. DOW CHEMICAL
      c. ER SYSTEMS, INC.
      d. CAPOLLA INDUSTRIES
      e. CERTAINTEED CORP.
   2. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

2.2 SPRAY APPLIED RIGID POLYURETHANE FOAM INSULATION SYSTEM

A. Product Approval:
   1. International Code Council Evaluation Services Report #3210
   2. Approved for non-structural walls in building types I, II, III, IV, and V construction under IBC and dwellings for IRC.
   3. Approved for exterior walls in building types I, II, III, and IV construction.
   4. Passed AC 377 Appendix X compliant NFPA 286.

B. Thickness: Apply to full depth as indicated on project drawings.

C. Physical & Performance Properties:
   1. Density (ASTM D 1622): 0.60 - 0.80 lb/cf (0.0096 to 0.013 gm/cu. cm).
   2. Thermal Resistance (ASTM C 518): R value per inch - 4.45 sf.h degree F/BTU.
   3. Air Permeance (ASTM E 283): 3.5 inches (89 mm) thick. 1) At 500 Pa: 0.003 L/s•m². 2) At 1000 Pa: 0.006 L/s•m². 3) At 1500 Pa: 0.011 L/s•m². 4) At 2000 Pa: 0.018 L/s•m².
   4. Compressive Strength (ASTM D 1621): 1.86 psi (12.9 kPa).
   5. Tensile Strength (ASTM D 1623): 3.87 psi (26.7 kPa).
   6. Vapor Permeance (ASTM E 96): 5 inches (127 mm): 4.95 Perms.
   7. Surface Burning Characteristics (ASTM E 84) 6 inches (152 mm): Class I. Flame Spread Index 15 to 20, Smoke Developed Index 400.
   8. Bio-based Solid Content (ASTM D 6866): 10%
   9. Off Gassing Tests (VOC Emissions) Berkeley Analytical Certificate 130312-01: Pass or Compliant (No toxic vapors).

D. Equipment: Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.

2.3 TRANSITION MEMBRANES AND FLASHINGS

A. Membrane at Transitions in Substrate and Connections to Adjacent Elements: The following products are acceptable for use with the spray polyurethane foam air barrier.
1. CCW-705 TWF by Carlisle Coatings and Waterproofing.
2. Perm-A-Barrier Flashing by Grace Construction Products.
3. Blueskin SA by Henry.
4. Poly Wall Self Adhering Flashing by Polyguard Products, Inc.
5. ExoAir 110 by Tremco, Inc.
6. Air Shield by W. R. Meadows, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

3.2 PREPARATION

A. Clean work area prior to application of sprayed insulation.

B. Mask and cover adjacent areas to protect from overspray.

C. Apply primers for special conditions as recommended by manufacturer.

D. Verify substrate temperature meets manufacturer’s requirements for specific formulations used.

E. Ensure that all fire-stopping is installed prior to application of spray foam.

3.3 SPRAY POLYURETHANE FOAM INSTALLATION

A. Application: Spray apply polyurethane foam in accordance with manufacturer’s installation guidelines to indicated thickness.
1. Install transition strips as required to provide continuity throughout the building enclosure.
2. Apply spray polyurethane foam in lifts not exceeding 1.5 inches in thickness.
3. Avoid formation of sub-layer air pockets.
4. Apply spray polyurethane foam in overlapping layers, in a manner to obtain a smooth, uniform surface to total thickness as indicated.
5. Do not apply spray polyurethane foam to inside of exit openings or electrical junction boxes.
6. Maintain a continuous layer of spray foam from floor to floor to roof to complete air barrier.

B. Joints, Penetrations and Gaps: All joints, penetrations and gaps of the thermal and air barrier wall system shall be made watertight and air-tight.

C. Site Tolerances: Maximum Variation in Applied Thickness - minus 1/4 inch, plus 5/8 inch.

3.4 CLEANING

A. Remove overspray from non-prescribed surfaces without causing damage to surfaces.

B. Remove protective covers from adjacent surfaces.

3.5 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 27 23

GYPSUM BOARD AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

1.2 Section Includes: Weather-resistant barrier (WRB) and air barrier (AB) assemblies consisting of the following components:

1. WRB / AB Gypsum Sheathing Board: Coated fiberglass-mat gypsum sheathing board system with integral weather-resistant barrier (WRB) and air barrier (AB) features, and all accessory materials required for covering sheathing joints, fasteners, penetrations, rough openings, and material transitions, for use under exterior wall claddings.
2. Fluid-Applied Flashings: Fluid-applied flashing and accessory materials for sheathing joints, inside and outside corners, fasteners, rough openings, material transitions and wall penetrations.

B. Related Sections:

1. Section 05 40 00 - Cold-formed Metal Framing.
2. Section 06 16 00 - Sheathing: Gypsum wall sheathing and plywood sheathing for roof work.
3. Section 07 27 26 - Fluid-Applied Membrane Air Barriers: Fluid-applied air barriers applied to CMU backup and fluid-applied flashing materials for gypsum board air barrier joints.
4. Section 07 62 00 - Sheet Metal Flashing and Trim.
5. Section 07 92 00 - Joint Sealants.

1.3 DEFINITIONS

A. Air Barrier (AB): Air tight barrier made of material that is relatively air impermeable but moisture vapor permeable, with sealed joints and penetrations, and with terminations sealed to adjacent surfaces.

B. Weather-Resistant Barrier (WRB): Water-shedding barrier made of material that is moisture-resistant, installed to shed water, with sealed joints and penetrations, and with terminations sealed to adjacent surfaces.

C. Rough Openings: Openings in the wall to accommodate windows and doors.

D. Material Transitions: Areas where the WRB / AB coated fiberglass-mat gypsum sheathing connects to beams, columns, slabs, parapets, foundation walls, roofing systems, and at the interface of dissimilar materials.

1.4 REFERENCE STANDARDS

A. ASTM C473 Standard Test Method for Physical Testing of Gypsum Panel Products.

B. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

C. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.

D. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

E. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

F. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

G. ASTM E119 Standard Test Method for Fire Tests of Building Construction and Materials.

H. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 C.

I. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

J. ASTM E2178 Standard Test Method for Air Permeance of Building Materials.

K. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

L. ICC ES AC212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing.

M. AAMA 714 Voluntary Specification for Liquid Applied Flashing Used to Create a Water Resistive Seal Around Exterior Wall Openings in Buildings.

1.5 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct conference at Project site prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, Installer, Architect, and system manufacturer's field representative.

1.6 ACTION SUBMITTALS

A. Product Data and Installation Instructions: Submit manufacturer’s product data including sheathing and accessory material types, composition, descriptions and properties, installation instructions and substrate preparation recommendations.

B. Shop Drawings: Submit shop drawings indicating locations and extent of WRB / AB system, including details of typical conditions, special joint conditions, intersections with other building envelope systems and materials; counterflashings and details showing bridging of envelope at substrate changes, details of sealing penetrations, and detailed flashing around windows and doors

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Applicator.

B. Product Test Reports: Submit test reports indicating compliance with specified performance characteristics and requirements.

C. Evaluation Reports: Accredited laboratory testing for materials

D. Warranty: Submit a sample warranty identifying the terms and conditions stated in Warranty Article.

1.8 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying air barrier sheathing materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

B. Mockups: Before beginning installation of WRB / AB sheathing, provide an assembly mockup incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate crack and joint treatment, sealing of gaps, terminations, and penetrations of air barrier sheathing.
   1. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
   2. Architect-approved mockups may remain in-place.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

B. Store air barrier AB coated fiberglass mat gypsum sheathing under cover and keep dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack sheathing flat and supported on risers on a flat platform to prevent sagging.

C. Protect fluid-applied material, primers and accessory materials from damage, weather, excessive temperatures and construction traffic.

D. Store fluid-applied material and primers at temperatures of 40 degrees F or above.

E. Sequence deliveries to avoid delays, but minimize on-site storage.

1.10 FIELD CONDITIONS

A. Application standards where applicable are in accordance with Gypsum Association Publication GA-253 for gypsum sheathing and ASTM C1280.

B. Do not install sheathing that is moisture damaged. Indications that panels are moisture damaged include, but not limited to, discoloration, sagging, or irregular shape.

C. Allow installed sheathing to be dry to the touch before sealing joints, penetrations, rough openings, and material transitions.

D. Do not attempt to seal joints, corners, penetrations, rough openings, and material transitions when installed sheathing surface is frozen or has frost on the surface

E. Do not apply sealing materials to sheathing when air or surface temperature is below 40F for fluid-applied materials.

F. Sequencing: Do not install air barrier material before the roof assembly has been sufficiently installed to prevent a buildup of water in the interior of the building.

G. Compatibility: Do not allow air barrier materials to come in contact with chemically incompatible materials which may adversely affect adhesion. Pressure-treated wood and other contaminated surfaces shall be cleaned with a solvent wipe before application.

H. Ultra-Violet Exposure: Do not expose air barrier materials to sunlight longer than as recommended by the material manufacturer.

1.11 WARRANTY

A. Manufacturer's Standard Warranty: Provide manufacturer's standard warranty for sheathing to be free of manufacturing defects that make it unsuitable for its intended use. Warranty period shall be five (5) years from the date of purchase of the product.

B. Material Warranty: Provide material manufacturer's standard product warranty, for a minimum three (3) years from date of Substantial Completion.

C. Exposure Warranty: Provide manufacturer's exposure warranty that offers twelve (12) months of coverage against in-place exposure damage (delamination, deterioration) beginning with the date of installation of the product.

D. Performance Warranty: Provide to Contractor the performance warranty registration for DensElement™ Barrier System. When properly installed, DensElement™ Barrier System is warranted to perform as a water-resistive barrier and air barrier as defined in the 2015 IBC and IECC for a period of five (5) years from the date of installation of the system in such structured.

PART 2 - PRODUCTS

2.1 WEATHER-RESISTANT BARRIER (WRB) AND AIR BARRIER (AB) ASSEMBLIES

A. Basis-of-Design System/Manufacturer: **"DensElement Barrier System"** as manufactured by GEORGIA-PACIFIC GYPSUM, LLC**";** 1-800-225-6119, http://www.buildgp.com/denselement-barrier-system
   1. System Components:
      a. Sheathing: **"DensElement Sheathing"**
      b. Fluid-Applied Flashing Materials: **"Prosoco R-Guard FastFlash Liquid-Applied Flashing Membrane"**
      c. Primers, Backer Rods and Accessory Materials: As approved by Georgia-Pacific Gypsum, LLC.
   2. Substitutions: In strict accordance with "Section 01 25 13 – Product Substitution Procedures."

B. System Description: Weather-Resistant Barrier and Air Barrier assembly installed at exterior stud walls under exterior cladding, consisting of the following components as herein specified:
   1. Sheathing: WRB / AB coated fiberglass mat gypsum sheathing.
   2. Fluid-Applied Flashing: Fluid-applied flashing to seal sheathing joints, inside and outside corners, penetrations, rough openings, and material transitions.
   3. Primer: Primer to seal raw gypsum edges before applying fluid-applied flashing.
   4. Backer rods and accessory materials

2.2 WEATHER-RESISTANT BARRIER (WRB) AND AIR BARRIER (AB) GYPSUM SHEATHING

A. Description: Coated fiberglass mat gypsum sheathing with integral weather-resistant barrier (WRB) and air barrier (AB) complying with applicable requirements of ICC ES AC 212, ASTM E2178, ASTM E2357.

B. Vapor Permeability: When tested as system in accordance with ASTM E96 (water method) the WRB and AB system has a minimum vapor permeance of 20 perms with sealed joints and fasteners

C. The WRB and Air Barrier Gypsum Sheathing has a moisture absorption rate < 6%

D. Air Barrier Performance Requirements:
1. Air Permeance of Sheathing: Sheathing with an air permeability not greater than 0.001 cfm/ft2 (0.02L/s/m2) when tested in accordance with ASTM E2178.
2. Air Permeance of Assembly: Assembly of sheathing and sealing components with an average air leakage not greater than 0.04 cfm/ft2 (0.2L/s/m2) when tested in accordance with ASTM E2357.

2.3 FLUID-APPLIED FLASHING (For sealing sheathing joints, inside and outside corners, fasteners, rough openings, material transitions and penetrations)

A. Substrate Requirements:
1. Sheathing joint and transition gaps to receive fluid-applied flashing shall be less than 1/4".
2. Gaps that are more than 1/8" and less than ¼" shall be filled with a backer rod to support the fluid-applied flashing at the transition joint.
3. For gaps larger than 1/4" use fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC.

B. Fluid-Applied Flashing For Panel Joints, Inside and Outside Corners, and Penetrations
1. Description: Water-based fluid-applied flashing.
2. Properties:
a. Acceptable Substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.
b. Adhesion to Fiberglass Mat Faced Sheathing: No delamination from face of sheathing.
c. Applied Wet Film Thickness: 16 to 30 mils.
d. Air Permeance: Meets 0.004 cubic feet per minute per square foot (0.02L/s/sq m), maximum, when tested in accordance with ASTM E2178.
e. Water Vapor Permeance: >10 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M.
f. Ultraviolet and Weathering Resistance: Approved for 12 months weather exposure.
g. Comply with applicable requirements of AAMA 714
3. Primer: Provide primer to seal the cut edges of gypsum sheathing.

C. Fluid-Applied Flashing for Sealing Fasteners:
1. Description: Water-based fluid-applied flashing.
2. Properties:
a. Acceptable Substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.
b. Adhesion to Fiberglass Mat Faced Sheathing: No delamination from face of sheathing.
c. Applied Wet Film Thickness: 10-15 mils.
d. Air Permeance: Meets 0.004 cubic feet per minute per square foot (0.02L/s/sq m), maximum, when tested in accordance with ASTM E2178.
e. Water Vapor Permeance: >10 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M.
f. Ultraviolet and Weathering Resistance: Approved for 12 months weather exposure.
g. Comply with applicable requirements of AAMA 714.

D. Fluid- Applied Flashing for Sealing Rough Openings:

1. Fluid-Applied Flashing: Water-based fluid-applied flashing.
2. Primer: Water-based primer to seal the cut edges of gypsum exposed in rough openings for windows and doors. Apply primer to raw gypsum board edges by brushing on a thin, uniform coat.
3. Properties:
    a. Acceptable Substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.
    b. Flashing Adhesion to Fiberglass Mat Faced Sheathing: No delamination from face of sheathing.
    c. Applied Wet Film Thickness: 16 to 30 mils.
    d. Flashing Air Permeance: Meets 0.004 cubic feet per minute per square foot (0.02L/s/sq m), maximum, when tested in accordance with ASTM E2178.
    e. Flashing Water Vapor Permeance: >10 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M.
    f. Ultraviolet and Weathering Resistance: Approved for 12 months weather exposure.
    g. Flashings comply with applicable requirements of AAMA 714.

E. Material Transitions Using Fluid-Applied Flashing:
1. Refer to substrate requirements for treatment of gaps as specified herein. Gaps from 1/8" to ¼" shall be filled with a backer rod prior to applying fluid-applied flashing. Gaps greater than ¼" shall be sealed with fluid-applied flashing as approved by Georgia-Pacific Gypsum, LLC
2. Fluid-Applied Flashing for Material Transitions: Water-based fluid-applied flashing.
3. Properties:
    a. Acceptable Substrate: Georgia-Pacific Gypsum LLC DensElement Sheathing.
    b. Adhesion to Fiberglass Mat-Faced Sheathing: No delamination from face of sheathing.
    c. Applied Wet Film Thickness: 16-30 mils
    d. Air Permeance: 0.004 cubic feet per minute per square foot (0.02L/s/sq m), maximum, when tested in accordance with ASTM E2178
    e. Water Vapor Permeance: >10 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M
    f. Ultraviolet and Weathering Resistance: Approved for minimum of 12 months weather exposure
    g. Comply with applicable requirements of AAMA 714

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove projections, protruding fasteners, loose or damaged sheathing material at edges of panel that might interfere with proper installation to seal joints, corners, fasteners, penetrations, openings, or material transitions.

B. Wipe down the sheathing surface to receive sealing materials with a clean cloth.

C. Comply with field conditions as outlined in Article 1.10 - Field Conditions.

3.2 INSTALLATION OF WEATHER-RESISTANT BARRIER (WRB) AND AIR BARRIER (AB) SHEATHING

A. Install WRB / AB coated fiberglass mat sheathing according to manufacturer's detailed installation instructions

B. Fastener and Penetration Treatment: Treat all countersunk fasteners penetrating through the fiberglass mat with specified fluid-applied flashing used for sealing joints.

3.3 FLUID-APPLIED FLASHING (For sealing sheathing joints, inside and outside corners, fasteners, rough openings, and material transitions)

A. Sealing Joints:
1. Apply specified Fluid-Applied Flashing over sheathing joints in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 2" on both sides of the joint.
2. Spread evenly over the sheathing joint with a 4" or 6" straight edge knife or trowel,
3. Apply at a rate to achieve a wet mil thickness of 16-30 mils over the entire joint area.

B. Sealing Vertical Corners:
1. Prime exposed gypsum edges with specified primer.
2. Apply fluid-applied flashing over the inside and/or outside corner in a zig-zag or ribbon pattern dispensed from either a tube type container. Cover a minimum of 2" on both sides of the corner.
3. With a 4" or 6" straight edge knife or trowel, spread evenly over the sheathing corner.
4. Apply at a rate to achieve a wet mil thickness of 16-30 mils over the corner area.

C. Sealing Fasteners:
1. Apply specified Fluid-Applied Flashing material to fasteners, and wipe down with a straight edge tool.
2. Provide a minimum 10-15 mil thick coating over the fastener.

D. Sealing Rough Openings:
1. Prime exposed gypsum edges with specified primer.
2. Apply a bead of fluid-applied flashing into the entire width of the inside corners of the opening dispensed from a tube type container.
3. Apply fluid-applied flashing onto:
    a. Sills of openings
    b. Jambs of openings
    c. Headers of openings
4. Apply fluid-applied flashing over the entire width of the opening sill, jamb, and header in a zig-zag or ribbon pattern dispensed from a tube type container.
5. Apply fluid-applied flashing over the sheathing adjacent to the opening sill, jamb, and header in a zig-zag or ribbon pattern dispensed from a tube type container. Cover a minimum of 2" of the sheathing surface adjacent to the opening.
6. With a 4" or 6" straight edge knife or trowel, spread fluid-applied flashing over entire width of the sill, jamb, header, and sheathing surface adjacent to the opening.
7. Apply at a rate to achieve a wet mil thickness of 16-30 mils over the opening area.

E. Sealing Material Transitions:
1. Sheathing joint and transition gaps to receive fluid-applied flashing shall be less than 1/4".
2. For gaps larger than 1/4" seal with fluid-applied flashing in accordance with manufacturer's instructions.
3. Gaps that are more than 1/8" and less than ¼" shall be filled with a backer rod to support the fluid-applied flashing at the transition joint.
4. If necessary, prime the adjacent material with primer per the material manufacturer's recommendations.
5. Apply fluid-applied flashing over the sheathing and adjacent material in a zig-zag or ribbon pattern dispensed from a tube type container. Ensure the flashing is a minimum of 3" on each substrate material surface.
6. With a 4" or 6" straight edge knife or trowel, spread fluid-applied flashing over material transition joint.
7. Apply at a rate to achieve a wet mil thickness of 16-30 mils.

F. Sealing Exterior Wall Penetrations:
   1. Exterior wall penetrations shall be sealed to prevent air and water infiltration. Penetrations may be sealed with fluid-applied flashing.
   2. For round or square pipe/duct penetrations use specified fluid-applied flashing. Refer to manufacturer's Technical Guide for proper sealing instructions.

3.4 FIELD QUALITY CONTROL

A. Do not cover installed WRB / AB assembly until required inspections have been completed and installation has been accepted.

B. Where applicable, allow for Owner's inspection and air barrier testing and reporting.

3.5 PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

END OF SECTION

SECTION 07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Air and water-resistive barrier membrane system, window and door flashing and accessory materials for application to exterior building envelope substrates as indicated on the drawings.

B. Related Sections:
1. Section 04 20 00 - Unit Masonry.
2. Section 06 16 00 - Sheathing.
3. Section 07 13 26 - Self-Adhering Sheet Waterproofing.
4. Section 07 27 33 - Gypsum Board Air Barriers: Gypsum sheathing with integral air barrier.
5. Section 07 62 00 - Sheet Metal Flashing and Trim.
6. Section 07 92 00 - Joint Sealants.

1.2 PREINSTALLATION MEETINGS

A. Pre-Installation Conference: Conduct conference at Project site prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, Installer, Architect, and system manufacturer's field representative. Agenda for meeting shall include but not be limited to the following:
1. Review of submittals.
2. Surface preparation.
3. Sequence of construction, responsibilities and schedule for subsequent operations.
4. Review of mock-up requirements.
5. Review of air leakage and bond testing.
6. Review and approval of all glazing applications
7. Substrate condition and pretreatment.
8. Minimum curing period.
9. Special details and sheet flashing.
10. Installation procedures.
11. Inspection procedures.
12. Review of protection and repair procedures.

1.3 PERFORMANCE REQUIREMENTS

A. Performance Description: Comply with the specified performance requirements and characteristics as herein specified.
1. The building envelope shall be constructed with a continuous, air and water-resistive barrier to control air leakage, avoid condensation in the interior wall assembly and prevent water intrusion.
2. Joints, penetrations and paths of water and air infiltration shall be made watertight and airtight.
3. System shall be capable of withstanding positive and negative combined wind, stack and HVAC pressures on the envelope without damage or displacement.
4. System shall be installed in an airtight and flexible manner, allowing for the relative movement of systems due to thermal and moisture variations

1.4 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation guidelines, including membrane and accessory material types, technical and test data, composition, descriptions and properties, installation instructions and substrate preparation requirements.

B. INFORMATIONAL SUBMITTALS

C. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

D. Certificates: Submit certificates by manufacturer stating that manufacturer and installer meet qualifications as herein specified

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with requirements specified for ASTM E2178.

F. VOC Certification: Submit certification that products furnished comply with regulations controlling use of volatile organic compounds (VOC)

G. Warranty: Submit a sample warranty identifying the terms and conditions stated in Warranty Article.

1.5 QUALITY ASSURANCE

A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing and air barriers. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five (5) years.

B. Applicator Qualifications: The installer shall demonstrate qualifications to perform the work of this section by submitting the following:
   1. Verification that the installer completed SWR Institute's Validated Air Barrier Training and is approved to perform work as herein specified by air and water-resistive barrier system manufacturer.
   2. List of at least three (3) projects completed of similar scope and complexity to this project carried out by the firm and site supervisor.

C. Inspection and Testing: Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover installed products or assemblies until they have been inspected, tested and approved.

D. Source Limitations: Obtain materials within the scope of this specification from a single manufacturer.

E. Regulations: Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOC).

F. Mockups: Prior to installation of the weather and air barrier system a field-constructed mock-up shall be applied to verify details and tie-ins, to demonstrate the required installation.

1. Construct a typical exterior wall section, 8 feet long and 8 feet wide, incorporating back-up wall, cladding, window, door frame, sill, penetrations, insulation, flashing and any other critical junction.

2. Allow 72 hours for inspection and testing of mock-up before proceeding with weather and air barrier work.
3. Coordinate construction of mockups to permit inspection by Architect and Owner's Representative before beginning installation.
4. If mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
5. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

C. Protect fluid-applied membrane components from freezing and extreme heat.

D. Sequence deliveries to avoid delays, but minimize on-site storage.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature and moisture content and other conditions affecting performance requirements.

B. Weather Conditions: Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used.

C. Proceed with installation only when the substrate construction and preparation work are complete and in condition to receive the membrane system.

D. Do not apply to frozen substrate. Allow adequate time for substrate to thaw, if freezing conditions exist before application.

1.8 WARRANTY

A. Manufacturer's Warranty Requirements: Submit manufacturer's limited warranty stating:
1. The products have been tested in accordance with national standards for air and water-resistive barriers and passed those tests with effectiveness and durability indicating their suitability for performance as an air and water-resistive barrier system when properly applied.
2. The products shall be free from defects and will not disintegrate and will maintain their integrity over the life of the warranty.
3. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 FLUID-APPLIED MEMBRANE AIR BARRIER

A. Basis-of-Design Product/Manufacturer: Fluid-applied air and water-resistive barrier is based on **"PROSOCO R-GUARD Cat 5,"** as manufactured by PROSOCO, INC., Lawrence, KS, (800) 255-4255, www.prosoco.com
   1. Approved Substitutions:
      a. Carlisle Barritech VP w/ Barribond LAMF
      b. WR Grace Permabarrier VPL w/ PB Liquid Flashing LAMF
      c. Tyvek Fluid Applied WB+ w/ Fluid Applied Flashing and Joint Compound LAMF
      d. GP DensElement integral weather barrier in the gypsum wall board with STPe based liquid flashing.
      e. Other Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Product Description: Fluid applied air and water-resistive barrier that combines silicone and polyurethane properties.
   1. Single component, Silyl-Terminated-Poly-Ether (STPE) that is roller applied to produce a highly durable, seamless, elastomeric weatherproofing membrane on exterior sheathing, CMU back-up walls, and pre-cast concrete.
   2. Prevents water and air penetration of the building envelope in weather up to 155 mph winds of a Category 5 hurricane.

C. Physical and Performance Properties:
   1. Living Building Challenge 2.0/2.1 Red List.
   2. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water Resistive Barriers Over Exterior Sheathing.
   3. ABAA: Air Barrier Association of America Acceptance Criteria for Liquid Applied Membranes.
   4. Comply with national, state and district AIM VOC: less than 30 grams per Liter.
   5. Air Leakage of Air Barrier Assemblies: Less than or equal to 0.04 cfm per square foot at 1.57 psf (less than or equal to 0.2 liters s·sq.m. at 75 Pa) when tested in accordance with ASTM E2357.
   6. Air Permeance: Less than or equal to 0.004 cfm per square foot (Less than or equal to 0.02 L/s/sq m) when tested in accordance with ASTM E2178.
   7. Water vapor transmission: 18 perms when tested in accordance with ASTM E96.
   8. Total solids: 99 percent.

2.2 WATER-BASED PRIMER FOR RAW GYPSUM BOARD EDGES

A. Primer to seal the cut edges of gypsum wall boards where they are exposed in rough openings for windows and doors. The sealed edge makes a compatible surface for easy application of liquid applied fiber-reinforced fill coat and seam treatment for through-wall components.
   1. Product: **"PROSOCO R-GUARD GypPrime"**

B. Physical and Performance Properties: Provide products with the following minimum properties:
   1. Breathable liquid primer.
   2. Comply with national, state and district AIM VOC regulations and be 100 g/L or less.

3. Total solids: 16 percent.

2.3 LIQUID-APPLIED FILL COAT AND SEAM FILLER

A. High modulus, gun-grade, crack and joint filler, adhesive and detailing compound that combines the best silicone and polyurethane properties. The single-component, Silyl-Terminated-Poly-Ether (STPE) prepares open joints, seams and cracks before installing primary water and air barrier system to prevent the movement of water and air through building envelopes.
   1. Basis of Design Product: **"PROSOCO R-GUARD FastFlash"**
   2. BASF MaxFlash
   3. STS Coatings LF-500
   4. Sto StoGuard RapidSeal
   5. Carlisle Barribond
   6. GCP Perm-A-Bond Liquid Flashing
   7. Dow 778 Silicone Liquid Flashing

B. Physical and Performance Properties:
   1. Living Building Challenge 2.0/2.1 Red List.
   2. AAMA 714-12 Voluntary Specification for Liquid-Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Wall Openings in Buildings.
   3. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
   4. Comply with national, state and district AIM VOC regulations and be 30 g/L or less.
   5. Water vapor transmission: 21 perms when tested in accordance with ASTM E96.
   6. Tensile strength: Greater than 150 psi when tested in accordance with ASTM D412.
   7. Elongation at break: Greater than 350 percent when tested in accordance with ASTM D412.
   8. Total Solids: 99 percent.

2.4 LIQUID-APPLIED FLASHING AND DETAILING MEMBRANE

A. Gun-grade waterproofing, adhesive and detailing compound that combines the best of silicone and polyurethane properties. The single component, Silyl-Terminated-Poly-Ether (STPE) produces a highly durable, seamless, elastomeric flashing membrane to treat joints, seams, cracks and provide the flashing membrane in rough openings of structural walls and to counter-flash waterproofing and air barrier components.
   1. Basis of Design Product: **"PROSOCO R-GUARD FastFlash"**
   2. BASF MaxFlash
   3. STS Coatings LF-500
   4. Sto StoGuard RapidSeal
   5. Carlisle Barribond
   6. GCP Perm-A-Bond Liquid Flashing
   7. Dow 778 Silicone Liquid Flashing

B. Physical and Performance Properties:
   1. Living Building Challenge 2.0/2.1 Red List.
   2. AAMA 714-12 Voluntary Specification for Liquid-Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Wall Openings in Buildings.
   3. ICC-ES AC 212 Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers Over Exterior Sheathing.
   4. Comply with national, state and district AIM VOC regulations and be 30 g/L or less.
   5. Water vapor transmission: 21 perms when tested in accordance with ASTM E96.

6. Tensile strength: Greater than 150 psi when tested in accordance with ASTM D412.
7. Elongation at break: Greater than 350 percent when tested in accordance with ASTM D412.
8. Total Solids: 99 percent

2.5 INTERIOR SEALANT FOR WINDOWS AND DOORS

A. High performance, gun-grade waterproofing sealant that combines the silicone and polyurethane properties. Single component, Silyl-Terminated-Poly-Ether (STPE) that is that is durable, and stops the movement of moist air through cracks surrounding windows and doors.
   1. Product: **"PROSOCO R-GUARD AirDam"**

B. Physical and Performance Properties:
   1. Living Building Challenge 2.0/2.1 Red List.
   2. Health Product Declaration v1.0 Standard.
   3. Comply with national, state and district AIM VOC: less than 30 grams per Liter.
   4. Sealant Validation from Sealant Waterproofing & Restoration Institute (SWRI).
   5. Elongation at break: 1000% when tested in accordance with ASTM D412.
   6. Peel strength: 25 pli when tested in accordance with ASTM C794
   7. Total solids: 98 percent.

C. Backer rod: In deep joints, control sealant depth by installing closed cell backer rod. Diameter of the soft-backer rod should be 25 percent greater than the joint width. Do not puncture backer rod.

2.6 PREFORMED SILICONE SEALANT EXTRUSION

A. Manufacturer's standard system consisting of pre-cured low modulus elastomeric extrusion that provides a continuous transition and bridges windows and doors frames at curtain wall, storefront, expansion joints, skylights, roof to air barrier materials. Preformed Silicone Sealant Extrusion System shall be continuous, flexible, durable, designed for high dynamic and thermal movement which is resistant to ultraviolet exposure and weathering.
   1. Product: **"PROSOCO SureSpan EX"**

B. Physical and Performance Properties:
   1. Elongation: Minimum 400 percent when tested in accordance to ASTM D412.
   2. Joint Movement Capacity: Minimum 200 percent elongation and minimum 75% compression per ASTM C1518 (ASTM C1523).
   3. Tensile Strength: Minimum 700 psi when tested in accordance with ASTM D412.
   4. Tear Strength: Minimum 200 lb/in when tested in accordance with ASTM D624.
   5. Tear Propagation: Pass testing requirements of ASTM C1518 (ASTM C1523). Movement Class shall exceed 200 percent Elongation and a Tear Class of PT (Knotty Tear).
   6. Shore Hardness A: 50 to 65 when tested in accordance with ASTM D2240.
   7. UV Resistance: No degradation of material when exposed to UV

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of air barrier system.

B. All surfaces shall be sound, clean and free of grease, dirt, excess mortar or other contaminants. Fill or bridge damaged surfaces, voids or gaps larger than one- inch. Fill voids and gaps measuring one- inch or less with liquid applied fill coat and seam filler as necessary to ensure continuity.
   1. Surfaces to receive primary fluid applied air and water barrier must be dry or damp, unless approved by air barrier manufacturer. Surfaces to receive (STPE) fluid applied accessories must be dry, damp or wet to the touch. Brush away any standing water present before application. STPE products will tolerate rain immediately after application.

3.2 SURFACE PREPARATION

A. Refer to manufacturer's product data sheets for requirements for condition of and preparation of substrates.
   1. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions.
   2. Remove contaminants such as grease, oil and wax from exposed surfaces.
   3. Remove dust, dirt, loose stone and debris.
   4. Use repair materials and methods that are acceptable to manufacturer of the air and water-resistive barrier system.
   5. Refer to manufacturer's product data sheets and manufacturer's installation guidelines for additional information on preparing structural walls to receive the primary air and water resistive barrier.

B. Exterior Sheathing:
   1. Ensure that sheathing is properly installed with ends, corners and edges properly fastened. Remove and replace damaged sheathing.
   2. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing, and spot overdriven fasteners with liquid applied fill coat and seam filler.
   3. Seal the cut edges of gypsum wall boards exposed in rough openings for windows and doors at corners, as recommended by manufacturer.

C. Masonry and Concrete Substrates:
   1. Masonry head and bed joints should be fully filled and tooled.
   2. Mechanically remove loose mortar fins, mortar accumulations and protrusions, and debris.
   3. Fill cracks, joints and gaps with liquid applied fill coat and seam filler as herein specified.

3.3 FIBER REINFORCED FILL COAT AND SEAM FILLER

A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.

B. Apply liquid applied fill coat and seam filler for seams, joints, cracks, gaps, primed rough gypsum edges at sheathing, rough openings per manufacturer's written instructions.

3.4 LIQUID APPLIED FLASHING AT WINDOWS, DOORS, OPENINGS AND PENETRATIONS

A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.

B. Apply liquid flashing membrane over surfaces to seal and waterproof rough openings per manufacturer's written instructions. Spread the wet product to create an opaque, monolithic flashing membrane which surrounds the rough opening and extends 4 to 6 inches over the face of the structural wall. Apply additional coats as needed to achieve void- and pinhole-free surface.

3.5 FLUID-APPLIED AIR & WATER-RESISTIVE BARRIER INSTALLATION

A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.

B. Apply air and water-resistive barrier to a clean, dry substrate within temperature and weather limitations per manufacturer's written instructions.
   1. Apply to recommended thickness.
   2. Allow product to cure and dry.
   3. Inspect membrane before covering. Repair any punctures or damaged areas by applying additional material.
   4. Back roll as necessary to ensure there are no pinholes, voids or gaps in the membrane. Apply fluid applied air and water-resistive barrier per manufacturer's recommendations.
   5. Apply additional coats per manufacturer's written instructions.

3.6 FLUID-APPLIED FLASHING TRANSITIONS

A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.

B. Apply fiber reinforced fill coat and seam filler and liquid flashing membrane as a liquid flashing membrane to waterproof the transitions in rough opening and between dissimilar materials per manufacturer's written instructions.
   1. Fill any voids between the top of the flashing leg and the vertical wall with fiber reinforced fill coat and seam filler.
   2. Spread the wet liquid flashing membrane to create a monolithic "cap-flash" flashing membrane per manufacturer's written instructions.
   3. Apply additional coats as needed to achieve void- and pinhole-free surface.
   4. Allow treated surfaces to skin before installing other wall assembly, waterproofing or air barrier components.

C. Apply preformed silicone sealant extrusion to provide a continuous airtight and water-tight seal between material frame and substrate per manufacturer's written instructions.
   1. Embed material in bead of liquid flashing membrane per manufacturer's written instructions.

3.7 INTERIOR SEALANT FOR WINDOWS AND DOORS INSTALLATION

A. General: Comply with weather and air barrier manufacturer's installation instructions, temperature limitations, product data and shop drawings.

B. Apply interior waterproofing sealant per manufacturer's written instructions.
   1. Install Backer rod: Compressible, closed cell rod stock as recommended by manufacturer for compatibility with sealant. Install Backer Rod as necessary per manufacturer's written instructions.
   2. Apply interior waterproofing sealant in continuous beads without gaps or air pockets

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
   1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
   2. Continuous structural support of air barrier system has been provided.
   3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
   4. Site conditions for application temperature and dryness of substrates have been maintained.
   5. Maximum exposure time of materials to UV deterioration has not been exceeded.
   6. Surfaces have been primed, if applicable.
   7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
   8. Termination mastic has been applied on cut edges.
   9. Strips and transition strips have been firmly adhered to substrate.
   10. Compatible materials have been used.
   11. Transitions at changes in direction and structural support at gaps have been provided.
   12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
   13. All penetrations have been sealed.

C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:
   1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186, smoke pencil with pressurization or depressurization.

D. Remove and replace deficient air barrier components and retest as specified above.

3.9 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION

SECTION 07 54 19

POLYVINYL-CHLORIDE (PVC-KEE) ROOFING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Design Intent (UA):
1. All roofing shall be detailed and installed such that the roofing system is decoupled from other façade and building elements. For example, a roof shall NOT be installed such that mechanical, electrical or veneer elements (brick, stucco, metallic copings, steep sloped roofing, etc) must be removed to properly repair a roof or reroof a building. Similarly, a roof shall not be installed such that removal of the roofing is required to properly repair other building elements. This will simplify maintenance and future roof replacement projects.
2. Roofing shall be detailed and installed to allow for roof replacement without requiring the removal of mechanical elements from curbs. Counter flashing at adjacent vertical elements will allow for roof replacement without removal of mechanical and electrical elements.

B. Section Includes:
1. Replacement of existing membrane roofing system with new, fully-adhered, smooth-back polyvinyl-chloride (PVC-KEE) membrane roofing system adhered to cover board over the following deck types:
   a. Structural concrete deck.
   b. Metal deck.
   c. Wood deck.
2. New membrane roofing system with new, fully-adhered, smooth-back polyvinyl-chloride (PVC-KEE) membrane roofing system adhered to cover board over the following deck types:
   a. Metal deck.
3. Rigid Insulation:
   a. Concrete Decks: Level & tapered rigid polyisocyanurate roof insulation, adhesively-attached to concrete decks.
   b. Metal and wood decks: Level & tapered rigid polyisocyanurate roof insulation, mechanically-attached to concrete decks.
4. Roof Cover Board: Mechanically attached to rigid insulation.
5. Detailing components, including prefabricated roof penetration flashings.
6. Drain sumps.
7. Roof walkway pads.

C. Related Sections:
1. Division 00 - General Contractor's Roofing Guarantee (DCM Form C-9).
2. Section 03 45 00 - Precast Architectural Concrete: Precast concrete copings installed as part of roof work (if applicable).
3. Section 06 10 00 - Rough Carpentry: Treated wood nailers and blocking for roofing work.
4. Section 06 10 00 - Rough Carpentry: Treated wood nailers and blocking for roofing work.
5. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal gutters, flashings, and trim.
6. Section 07 71 00 - Roof Specialties: Manufactured roof fascia.
7. Section 07 72 00 - Roof Accessories: Roof curbs and equipment supports.
8. Section 07 92 00 - Joint Sealants: Joint sealants for roofing work

1.2 ROOFING SYSTEM DESCRIPTIONS

A. Rigid Insulation over Structural Concrete Deck:
   1. Adhere rigid insulation (2 layers staggered) to deck with insulation adhesive.
   2. Adhere cover board to rigid insulation with insulation adhesive.
   3. Fully adhere PVC-KEE roofing membrane to cover board.

1.3 DEFINITIONS

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

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms:
   1. ASTM D 1079 “Terminology Relating to Roofing and Waterproofing.”
   2. Glossary of NRCA's "The NRCA Roofing and Waterproofing Manual."
   3. Roof Consultants Institute “Glossary of Roofing Terms.”
   4. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

B. ASTM D6754 Standard Specification for Ketone Ethylene Ester Based Sheet Roofing

C. ASTM D 751 Test Methods for Coated Fabrics

D. UL 790 Underwriters Laboratories (UL) - Fire Hazard Classifications

E. FM 4470 GM Global (FM) - Roof Assembly Classifications

F. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. FM Class 1: Provide Fire rating from within (NFPA 276 or FM 4880)

D. UL Class A: Provide Fire rating from above (ASTM E-108)

E. Wind Uplift: Provide System with certified UL 1879 and FM uplift resistance approval up to the structural loading up to the design wind speed, but not less than FM I-75 for buildings with average roof heights of 30 feet or less and FM I-90 for buildings with roof heights greater than that.

F. Hail Rating: Provide FM 4470 Severe Hail (SH) rating

G. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1.6 PRE-INSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Before starting roof tear-off, conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review deck slopes.
10. Review roof observation and repair procedures after roofing installation.

1.7 SEQUENCING

A. Sequence installation of PVC roofing with related units of work specified in other Sections.
1. Ensure that roof assemblies, insulation, flashing, trim, accessories, and joint sealers, are protected against damage from effects of weather, corrosion, and adjacent construction activity.

1.8 ACTION SUBMITTALS

A. Product Data: Provide current standard printed product literature indicating characteristics of membrane materials, flashing materials, components, wood nailers, pipe supports, accessories, product specifications and installation instructions complying with contract requirements, including UL and FM approvals.

B. A letter from the manufacturer stating the installer is approved by the manufacturer to install the product.

C. Manufacturer shall issue intent to warrant letter from the roofing manufacturer listing all products to be used and a statement of compatibility of those products, and a sample of the warranty. The preinstallation meeting shall not be held until the sample warranty has been approved.

D. Shop Drawings: Provide details of the following as applicable.
1. Flashings for pipes and vent stacks.

2. Drain sump details and connection to drain leaders. Roof drains shall be installed in such a manner as to be below the level of the sump area. Apply a generous bead of approved sealant between the flashing sheet and drain bowl flange, the flashing sheet and clamping ring. Tighten clamping ring uniformly until sealant disperses out from under and above clamping ring and assembly is sealed. Lap roof membrane onto flashing a minimum of 6" and heat-weld.
3. Drain scuppers: Through wall scuppers shall be four sided where possible. Scuppers shall be sealed watertight on the roofing AND veneer side of walls. If lambs tongues Use a prefinished aluminum collar on the exterior of through wall scuppers to match the construction. Collar shall be anchored to the wall at 6” centers, terminate in a caulk tray and seal with silicone sealant around the top and sides of the collar.
4. Base flashings and membrane terminations. No exposed sealants allowed at roof membrane terminations. Cover all sealant and membrane terminations with storm collar or counterflashing.
5. Roof edge/fascia details.
6. Crickets, saddles, and tapered edge strips, including slopes.
7. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
8. Roof walkpad layout.
9. Roof curb details.
10. Penetration box (Gooseneck) details at ganged pipe penetrations.
11. Mechanical curbs. Curbs shall extend 12 inches above the field of the roof. Curb flashing shall Include a stainless steel skirt set in butyl tape on top of the curb. The SS skirt shall extend below the mechanical equipment skirt and include a receiver to receive CF to cover a future roof termination. This will allow a reroof project to be executed without removal of the mechanical equipment.
12. Mechanical curb rails: Curb rail caps shall be fabricated watertight, constructed with non-corroding metal and include a minimum 2” skirt shingle lapped over the membrane termination.
13. Pipe penetration with storm collar: All pipe penetrations shall have stainless steel or copper storm collars installed with a caulk tray and clamp band above the membrane termination. This protects the roofing sealant from UV degradation. Silicone sealant shall be used in the rain collar caulk tray.
14. Expansion joints: Expansion joints fabricated from the roofing membrane shall be used. If metallic expansion joints are needed, they shall be fabricated by the roofing contractor. Prefabricated metallic roofing expansion joints shall not be used.
15. Expansion joint to roofing transition.
16. Parapet coping: Coping shall be designed and installed to never be removed.
    a. Copper, prefinished aluminum or brushed stainless copings shall be used. Use of galvanized coating steel copings will only be allowed in special conditions with written UA design staff approval.
    b. Copings shall slope approximately 1” per foot toward the roof.
    c. Standing seam copings are preferred on copings over 15 feet high. Flat seamed copings with 8” backer splices are preferred on copings less than 15 feet high.
    d. Flat seamed copings shall have solid backing the full width of the coping to prevent sagging from personnel stepping on the coping.
    e. All copings must be underlaid with ice and water shield or roofing membrane.
    f. Copings and coping cleats shall be anchored a minimum of 12 inches on center.
    g. Continuous cleats shall be used on the outside of copings. Copings may be surface anchored on the roofing side if EPDM washers are used under the screw heads.
    h. A 360 degree receiver shall be folded into the inner drip of the coping to receive counterflashing that will cover future reroofing membrane terminations.
    i. Metal shall extend at least 1” below all blocking prior to reaching the drip.

j. Copings shall be terminated at higher walls with a coping end cap anchored to the veneer of the higher wall, with through wall flashing draining above the coping termination flange. The coping termination shall fold 3" up and on the sides of the veneer, be anchored and have an integral caulk tray with silicone caulk.

17. Wall system to roofing transition: Through wall flashing (TWF) is required to drain above the roofing termination. At coping terminations to a higher wall, TWF shall extend at least 3 inches past the sides of the coping and exit above the coping end cap.
18. Roof penetrations by numerous conduits or pipe shall be grouped and run through non-corroding, metallic goosenecks with the outlet pointing down a minimum of 10 degrees.
    a. Goosenecks may be fabricated from coated metal, copper, ss or prefinished aluminum.
    b. If goosenecks are not fabricated with coating metal, coated metal base flashing must turn up 8 inches and the gooseneck must slide over and shingle lap 6" over the coating metal. Screws anchoring the gooseneck to the coating metal must have EPDM washers.
    c. The top of goosenecks shall be sloped a minimum of 10 degrees and extend over the gooseneck opening at least 12 inches.
    d. Goosenecks shall be shown adjacent to all mechanical units. Discuss mechanical layout with mechanical engineer and owner to limit penetrations and allow one gooseneck to serve numerous units.
    e. The inside of gooseneck shall be insulated to meet energy code and not allow air flow.
    f. Goosenecks shall be insect resistant.
    g. Elements running through goosenecks shall be sloped downward as they exit the roofing side gooseneck to prevent water from running the element and entering the gooseneck.
19. Electrical outlets shall not be mounted to the sides of curbs. This is a non-warrantable roof penetration. All electrical, water, and data penetrations shall be made through a warrantable roof termination list a single conduit flashing, gooseneck, or covered by a sloping water shield extending at least 12" over the penetration.
20. Grouped wall penetration through roof membrane: Grouped wall penetrations shall be covered by a sloping (10 degrees minimum) rain cover just like goosenecks. Elements penetrating walls shall be sloped just like that for goosenecks.
21. Hot pipe penetrations. Hot pipe flashings shall extend a minimum of 8" above the field of roof.
22. Membrane transition to other roofing systems: Transitions from steep sloped to low sloped or low sloped roofing system to different low sloped roofing systems shall be shown and dimensioned on the drawings.
23. Eave transition to gutters or fascia. Reference drawings to see if colored fascia is required or if the roofing membrane can be exposed at the fascia. Show dimensions on eave flashing with a minimum 2 inch shingle lap over beck leg of gutter or wall elements. If possible separate roofing system from wall elements with sealant joints between the two. Colored fascia shall be prefinished aluminum snapped over the coated metal fascia.
24. Show base flashing and counter flashing below adjacent wall elements that decouples roofing from wall systems. Detail shall allow removal and reinstallation of ONLY the CF to execute a reroofing project.
25. Any unusual condition that may not be covered by SMACNA or NRCA standard details shall be detailed or noted on the drawings. These conditions cannot be left to the roofers discretion. For reroofing projects, these areas are typically those with three or four layers of sealant installed to stop previous leaks.
26. All lap sealants and cut off mastics at roofing membrane and base flashing terminations shall be protected from UV exposure. SS or copper Rain shields and counter flashings shall be installed to shingle lap at least 3 inches over these sealants. Rain shields and counter flashings shall be sealed at the top with silicone sealant. Counter flashing must have caulk trays. Rain shields must be anchored with a SS clamp band.

27. Reroofing: All details shall be provided such that reroofing can be executed without disturbing adjacent building elements. All copings, TWF or other hard mounted metals shall have receivers to hold CF to cover roof terminations for future reroof projects.
28. All membrane and base flashing terminations shall be with a termination bar and caulk tray, anchored a maximum of 8 inches on center unless folded over curbs or parapets. All membrane terminations shall be shielded from UV exposure by using counterflashing or storm collars.
29. Handrails, balustrades and other horizontal elements above the roof shall extend at least 6 inches above the plane of the roof to allow access for installation and repairs. If the element is more than 12 inches wide, it shall be at least 12 inches above the roof.
30. Posts, newels and other penetrations shall be detailed such that reroofing and repairs can be made without removal of the penetrating element. The design shall also allow for reroofing without the removal of these finishes, or the finishes shall be designed to be easily removed and reinstalled to allow for reroofing.
31. Pitch pockets are not allowed.
32. All membranes shall be rolled in place with heavy rollers to ensure good adhesive contact and limit sheet wrinkles.
33. The roofing membrane may be carried over parapet walls, but either metallic copings or parapet cap flashings shall terminate with a receiver on the roofing side to receive a counter flashing to cover a future roof termination when the building is reroofed.
34. Flashing anchorage shall meet SPRI ES-1 Standards. Minimum anchorage of wood blocking and flashing to be No. 12 screws installed at 12 inches on center staggered. Sheet metal flashing terminations intended to be water tight shall be anchored a maximum of 8 inches on center.
35. All exposed sheet metal finishes are to have ice and water shield (high temperature peel and stick) or the roof membrane installed below them with a slip sheet between the two to ensure long term water tightness.
36. Insulation shall meet energy code requirements.
37. Use two layers of insulation with staggered joints when more than 1 1/2” of insulation is needed.
38. All structural penetrations through roof shall be circular or pipe members. No wide flanges, bars are channels shall be allowed to penetrate the membrane.

E. Samples:
   1. Roofing Membrane: Submit 3 x 5 inch or larger samples of roofing membranes and all specified accessories, with manufacturer's identification labels attached. If colored membranes are used, submit color samples.
   2. Accessories: Submit representative samples of the following:
      a. Insulation.
      b. Cover board.
      c. Prefabricated flashings
      d. Coated metal
      e. Fasteners: Submit representative samples of each type of fastener and roofing accessory with manufacturer’s identification labels attached.

1.9 INFORMATIONAL SUBMITTALS

A. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
   1. Submit evidence of meeting performance requirements.

C. Qualification Data: For Installer and manufacturer.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

E. Research/Evaluation Reports: For components of membrane roofing system.

F. Material List: Submit a descriptive list of all component parts of the roofing systems that will be covered under warranty.

G. Fastener pull-out test report.

H. Specimen Warranty: Submit two copies of the manufacturer's Roofing System warranty for the project.

I. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.10 CLOSEOUT SUBMITTALS

A. Roofing Manuals: Submit, in digital (.pdf) format and in a three-ring binder, all roofing data including manufacturer's catalogs/manuals of materials, maintenance data, and accessories used in the Project.

1.11 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Experience: The roofing manufacturers shall have been in the business of manufacturing PVC roofing membrane systems for a minimum of ten (10) years.
   2. Manufacturer shall have UL listing or FMG approval for roofing system identical to that used for this Project.
   3. Applicators: Manufacturers shall have an on-going Approved Applicator Program.
   4. Manufacturer's Field Representative: Manufacturer shall provide technical representatives (employees) to inspect the installation of the roofing systems to assure installation is in accordance with warranty requirements.
      a. Written reports of observations and recommendations shall be furnished to the Architect every two weeks.
   5. Manufacturer's technical representative shall be on site during the first day of the installation to ensure all installers have been properly trained to install the roofing.
   6. Manufacturer's technical representative shall visit the jobsite once during each week the roofing system is being installed.
   7. Manufacturer's technical representative shall issue a written report digitally to all parties within 3 days of the jobsite visit.
   8. Manufacturer shall conduct all visits required to ensure the roofing is installed properly and can be warranty per project requirements.
   9. Installer shall calibrate heat welding equipment upon every startup of the equipment.
   10. Three 6 inch long heat welded samples shall be provided for every day heat welding occurs. Samples shall be labeled with the date, building and locations and turned over to Owner at completion of the work.
   11. Two 1 inch wide heat welded seams shall be cut from production heat welds and saved for tests. Samples shall be labeled with the date, building and locations and pull tested.
   12. All seams shall be checked after cooling and repaired, if required, by the Contractor within 24 hours after hot air welding.

a. Seams with blisters, fish mouths, wrinkles or other defects are unacceptable and shall be repaired.
b. Patching and repair of defective seams shall be as directed by Membrane Manufacturer, Construction project manager or owner. Minimum patch shall extend beyond defect a minimum of 3" in all directions and be fully hot air welded.

B. Installer's Qualifications: Roofing installer shall be certified in writing by the roofing materials manufacturer to install the primary roofing products and that is eligible to receive the specified manufacturer's guarantee.
1. Provide a list of five (5) completed projects installed in the north Alabama geographic area.

C. Source Limitations: Obtain components for membrane roofing system from or approved by roofing membrane manufacturer. All products used in the system must be labeled by the single source roofing manufacturer issuing the guarantee.

D. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

E. Test Reports:
1. Roof drain and leader test or submit plumber's verification.
2. Core cut (if requested).
3. Roof deck fastener pullout test.

F. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

G. Roof Slope: Maintain minimum roof membrane slope of 1/4 inch per 12 inches, unless otherwise indicated.

H. Foreman: The roofing foreman shall have a copy of these specifications on the job site at all times.

I. The roofing contractor shall maintain an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts, and who are completely familiar with the specified requirements and methods necessary for the proper performance of the work.

J. Mockups:
1. Build mockups of the following conditions to demonstrate aesthetic effects and set quality standards for materials, execution, and installation:
a. Roofing Sample - Concrete Deck: Install a minimum 60 sq. ft. portion of roofing including primers, insulation, cover board, base flashings, and roofing membrane. Locate as directed by Architect
b. Sumped roof drain.
c. Typical roof penetration flashing devices.
d. Typical roof curb or equipment curb.
e. Typical gang pipe penetration box (Gooseneck).
f. Parapet Wall: Include manufactured metal copings, wall cladding, and metal counterlashings.

g. Roof Expansion Joints or Roof Divider.

2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials and accessories in manufacturer's original protective containers with labels intact and legible. Comply with manufacturer's published instructions for storage and handling.
   1. Each pallet, container, or unit shall have the material manufacturer's name and brand designation clearly listed.

B. Store materials in dry protected areas, on clean, raised platforms with securely anchored weather protective covering.
   1. Store roll goods on a clean, flat, and dry surface.
   2. All material stored on the roof overnight shall be stored on pallets.
   3. Rolls shall be stored on ends.
   4. Store materials on roof in a manner to prevent overloading of deck.
   5. Store flammable materials away from open flames, sparks or excessive heat.
   6. Cover all materials with polyethylene or other waterproof plastic coverings.
   7. Insulation: When stored outdoors, stack insulation on pallets or dunnage at least four (4) inches above ground level and covered with "non-sweating" tarpaulins
   8. Store metal flashings and counter flashings in such a way as to prevent wrinkling, twisting, scratching and other damage.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
   1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

D. Protect roof insulation materials and cover boards from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

E. Handle all materials in a manner to prevent damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

F. Damaged Materials: Immediately remove and replace damaged or improperly stored materials from project site.

G. Winter Storage: During winter, store materials in a heated location with a 50 degrees F. minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.

1.13 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
   1. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.
   2. Do not exceed temperature limitations recommended by the manufacturer.

B. Water Infiltration: If water infiltrates under or between the roofing plies or insulation during the installation of the roofing system, remove and replace that portion of the roof, including wet insulation.

C. Debris Removal: Remove all debris daily from project site and legally dispose.

E. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout the project.

F. Secure roofing, remove all loose materials and equipment from roof deck and secure in staging area upon the issuance of a Hurricane Watch, Hurricane Warning or other imminent danger.

1.14 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard NDL (no dollar limit), Non-Pro-Rated warranty covering leaks from all roof membrane, insulation, fasteners, flashings, parapet copings and edge metal, sheet metal details, and other specified components. Warranty shall also cover the labor required for proper repairs including replacement of wet insulation and roof membrane caused by a covered leak.
   1. Warranty Period: **Twenty (20)** Years from date of Substantial Completion
      a. Warranty shall also cover damage due to hail and windstorms up to 90 mph, with 3 second gusts.
      b. Warranty shall not exclude random areas of ponding water from coverage.
      c. Warranty shall include labor and material to repair leaks resulting from manufacturer and workmanship defects.
      d. Warranty shall repair wind damaged roofing prior to owner insurance coverage engaging owner's insurance.
      e. Warranty shall be governed by Alabama law and adjudicated in Alabama.
      f. Require not less than 30 days to notify manufacturer of potential warranty claim from observance of potential defect.
      g. Consequential damages may be excluded except for failure of essential purpose (if the warranty is not honored).
      h. Time for filing a legal claim shall be not less than 5 years, or governed by state law, whichever is greater.
      i. Manufacturer may make subsequent inspections of the roof not more than once a year at no cost to the owner.

B. Installers Roofing Guarantee: The installer shall provide a 5-year watertight workmanship warranty per standard ABC form C-9.

C. General Contractor's Roofing Guarantee: Provide General Contractor's guarantee in accordance with Division 00 - **General Contractor's Roofing Guarantee (ABC Form C-9, August 2001)**
   1. Guarantee Period: **Five (5)** Years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 POLYVINYL-CHLORIDE (PVC) ROOFING MEMBRANE

A. Basis-of-Design Product/Manufacturer: Adhered, smooth-back PVC-KEE membrane, white color, is based on **"45-mil FiberTite-SM"** ketone ethylene ester (KEE) membrane, reinforced with a 5-oz yd² knitted polyester fabric as manufactured by **SEAMAN CORPORATION;** 1000 Venture Boulevard, Wooster, Ohio 44691, 1-800-927-8578, http://www.fibertite.com/
   1. Approved Substitutions:

a. **Duro-Last "60 mil PVC Duro-Last EV60" with Dupont Elvaloy KEE polymer**, smooth back"
b. **Johns Manville, Inc. "60 mil JM PVC with Dupont Elvaloy KEE polymer"** smooth back.
c. **Siplast "Parasolo PVC with Dupont Elvaloy KEE polymer"**, smooth back.
d. Fleece backed membranes shall be used when installing roofing directly to irregular substrates.

2. Other Substitutions: NOT ALLOWED.

2.2 AUXILIARY ROOFING MATERIALS

A. Sheet Flashing - Reinforced: Manufacturer's sheet flashing of same material, type, reinforcement, thickness, and color as sheet membrane.

B. Sheet Flashing - Unreinforced: Manufacturer's unreinforced sheet flashing of same material as sheet membrane.

C. Membrane Adhesive: Manufacturer's recommended bonding adhesive for membrane.

D. Interlayer Adhesives: Two component, low rise polyurethane foam shall be used, if approved by roofing manufacturer, for adhering other materials.

E. Metal Termination Bars: Manufacturer's standard predrilled stainless steel or aluminum bars, a minimum of 1" wide by 1/8 inch thick; with anchors pre-punched at 8" on center maximum. Termination bars shall have an integral caulk tray.

F. Metal Flashing Sheet: Metal flashing sheet is specified in "Section 07 62 00 - Sheet Metal Flashing and Trim." Metal flashings that are not required to be membrane coated metal shall be 0.040" aluminum, 16 oz copper, 26 gauge stainless steel, terne coating stainless or brushed stainless. Thicker material may be required depending on the installation. Galvanized painted metal shall not be used without prior Owner approval. This is typically limited to pre-engineered, prefabricated metal building systems.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

H. Fasteners for Treated Wood: Provide stainless steel fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.

I. Sealants: Manufacturer's recommended one-component gun-grade polyurethane sealant to seal flashing terminations. ALL EXPOSED SEALANT WILL BE SILICONE.

J. Pre-Molded Accessories: Provide manufacturer's standard pipe flashings, split pipe seals, square tubing wraps, molded sealant pockets, preformed inside and outside corners, and other accessories.

K. Where possible, use prefabricated boots, and inner and outer corners shall be used.

L. Coated metal: 0.020" membrane material laminated to 25 gage galvanized sheet metal.

2.3 COVER BOARD

A. Cover board (insulation overlayment) shall be a water resistant substrate conforming to the following:
   1. FM approved meeting Class A 1-90, for fire and wind.
   2. UL Classification: Class A Assembly.
   3. Meet requirements of ASTM C 473
   4. Use 4x4 sheets with adhered cover boards. 4x8 sheets may be used for mechanically anchored cover boards.
   5. Fiberglass faced, 500 psi minimum, gypsum-based material
   6. Approved Products:
      a. Georgia-Pacific **"DensDeck Prime";** minimum ½" thick.
      b. USG Corporation "**Securock Gypsum-Fiber Roof Board";** minimum ½" thick.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
   1. R-Value: The average R-value of the roof insulation assembly shall be calculated using the LTTR (long term thermal resistance) method. The ASTM C518, 5 year aged R value shall be a minimum of 5.7 per inch.

B. Polyisocyanurate Flat Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) unless a higher strength board is required. felt or glass-fiber mat facer on both major surfaces. Shall meet FM Class 1 approval.
   1. Thickness: Two layers, minimum, to provide minimum total R-value of R-25, unless otherwise indicated on drawings.
   2. ASTM C518, 5 year aged R value shall be a minimum of 5.7 per inch.

C. Tapered Polyisocyanurate Insulation: Factory-tapered insulation boards, ASTM C 1289, Type II, Class 1, Grade 2 (20 psi) felt or glass-fiber mat facer on both major surfaces, fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated. The tapered system shall have a minimum thickness in compliance with the applicable building and energy codes, but not less than an average R-value of R-20, unless otherwise indicated on drawings.

2.5 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide manufacturer's standard factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer.
   1. Drive pins are not allowed. SS hammer screws shall be used instead of drive pins.
   2. Fasteners to be stainless steel or contain a corrosion resistant coating to resist 1,000 hours of 5% salt spray testing per ASTM B117 without showing read rust, and meet FM 4470 corrosion resistance requirements. Fasteners for pressure treated wood shall be stainless.
   3. Deck screws shall be fully threaded, heavy duty, coated steel capable of penetrating two layers of 18 gage steel deck without damage to the tip, threads or shank.

4. Plates shall be minimum 18 gage galvanized steel.

D. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

E. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

2.6 WOOD NAILERS AND BLOCKING

A. Preservative Treatment by Pressure Process: Wood nailers, curbs and blocking shall meet Category UC4A - Ground contact, general use. Comply with requirements in "Section 06 10 00 - Rough Carpentry**.**
1. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
2. Wood shall be No. 2 or better construction grade lumber.
3. Creosote or asphaltic type preservatives are not acceptable.
4. Minimum top nailer thickness shall be 1 ½ inches nominal.

2.7 WALKWAYS

A. Flexible Walkways:
1. Basis of Design: **FIberTite "FTR-Tuff Track Walk Way & Protection Pads"**; high grade walk way/protection material with "slip resistant" design.

2.8 METAL FLASHING

A. Flashing Material: All exposed metal flashings shall be in accordance with "Section 07 62 00 - Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Concrete Decks:
a. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
b. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
1) Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Verify that rooftop utilities and service piping have been shut off before commencing Work.

B. Protect existing roofing system that is not to be reroofed.

C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
   1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing roofing system components that are to remain.

3.3 ROOF TEAR-OFF

A. Roof Tear-Off: Remove all roofing membrane, surfacing, cover boards, insulation, copings, fasteners, asphalt, pitch, adhesives, etc. down to concrete deck.
   1. Remove an area no larger than can be re-roofed in one day.
   2. Tear out all base flashings, counterflashings, pitch pans, pipe flashings, vents and like components necessary for application of new membrane.

B. Remove abandoned equipment, curbs, and penetrations.

C. Immediately remove all debris from roof surface. Demolished roof system and materials shall not be stored on roof surface.

3.4 TEMPORARY WATERPROOFING

A. Parapets: Temporarily seal base flashing ply to top of parapets to prevent water from infiltrating behind membrane. Employ measures to protect perimeter fire safing insulation from moisture damage. Install temporary membrane waterproofing over gap in roofing expansion joints.

3.5 DECK PREPARATION

A. Clean deck substrates of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Concrete Decks (if applicable): If required, prime surface of concrete deck in accordance with roofing system manufacturer's written instructions.

C. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.6 EXAMINATION AND ACCEPTANCE OF SURFACES

A. Verify decks and insulation are dry and free of moisture of any form.
   1. Verify proper placement of all penetrations.
   2. Verify proper securement of penetrating or roof mounted equipment.

B. Inspect roof perimeters, edges, penetrations and transitions to vertical surfaces to ensure that blocking or wood nailers have been installed where appropriate and have been secured to comply with design up-lift pressures.

3.7 JOB AND WEATHER CONDITIONS

A. Suspend all application and installation activities during inclement weather.

B. Protect adjacent building surfaces against damage and adhesive spillage.

C. Water Cut Offs: Protect roof deck and insulation from moisture by providing water cut-offs at the end of each day's work or when the weather is threatening.
   1. Failure to protect the deck insulation and roofing from moisture will result in the removal of damaged materials or materials containing excessive moisture.
   2. Remove water cut-offs prior to start of new work.

D. Do not permit traffic or material storage on completed roof surfaces.

3.8 RIGID INSULATION INSTALLATION

A. Sweep all surfaces prior to commencement of roofing.

B. Coordinate installation of roof system components so insulation and cover board is not exposed to precipitation or left exposed at the end of the workday.

C. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.

D. Insulation - Double Layer (Concrete Decks): Install both layers of polyisocyanurate insulation and cover board with specified insulation adhesive.
   1. Install joints of each succeeding layer staggered from joints of previous layer a minimum of 6” in each direction.
   2. Fill gaps exceeding 1/4 inch with like material.

E. Lay insulation at right angle to the desired direction of the roofing and in parallel courses with cross-joints staggered.
   1. Construct second layer of insulation at right angles to initial base layer, stagger joints.
   2. Butt edges without forcing.

F. Cricket Areas: Install each cricket directly over insulation. Construct to facilitate prompt and complete removal of water to each roof drain.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Apply no more insulation and cover board in one (1) day than can also receive the roofing system and the necessary temporary edge seals or water cut-offs within the same day.

3.9 COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints of cover board in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with cover board.
1. Cut and fit cover board within 1/4 inch of nailers, projections, and penetrations.

D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

E. Adhered Cover Board: Adhere cover board to rigid insulation in specified adhesive according to roofing system manufacturer’s instruction.

3.10 WOOD NAILERS

A. Locate and install wood nailers as indicated.

B. Anchor wood nailers to structural deck with manufacturers approved fasteners, spaced appropriately for the specified installation. Minimum withdrawal resistance for each fastener shall be 100 pounds.

3.11 POSITIVE DRAINAGE

A. Install tapered systems, including crickets and saddles, to assure positive drainage to internal drains to preclude ponding water remaining on any part of the roof in excess of forty-eight (48) hours.

B. Slope Verification/Positive Drainage: Correct any and all low spots that accumulate water in order to achieve complete drainage into roof drains.

3.12 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

D. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Decouple roofing membrane from adjacent construction such that membrane can be repaired without distraction to adjacent construction.

3.13 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
1. Install sheet according to ASTM D 5036.

B. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

C. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
1. Repair tears, voids, and lapped seams in roofing membrane that does not meet requirements.

3.14 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.15 ROOF DRAIN INSTALLATION

A. Sumped Roof Drains: Create sumps at all internal roof drains to facilitate drainage. Provide smooth transitions to avoid abrupt changes in the roofing membrane.
1. Provide a nominal roof sump area of 4’ - 0” x 4’ - 0”, centered at the drain.
2. Sumps shall have a minimum slope of ½” per 12 inches.
3. Half sumps are acceptable at scuppers.
4. Clamp roofing membrane and stripping into roof-drain clamping ring according to roofing system manufacturer's written instructions.
5. Connect roof drains to drain leaders.

B. Overflow Roof Drains: Overflow roof drains do not require sumps.

3.16 SEALANTS

A. Apply authorized sealants to all surface mounted reglets and per project requirements. Sealants are to shed water. Follow all manufacturer's instructions and installation guides.

B. Use primer when recommended by the manufacturer.

C. Sealants will require periodic maintenance by the building owner's maintenance personnel.

3.18 METAL FLASHING

A. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

B. Cover all exposed sealant with metal flashing.

3.19 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated, or if not indicated at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, mechanical equipment, etc.),
   1. Adhere with compatible adhesive or heat weld walkway products to substrate according to roofing system manufacturer's written instructions.

3.20 FIELD QUALITY CONTROL AND INSPECTIONS

A. Manufacturer’s Technical Representative: Roof system manufacturer shall provide regular inspections during installation of the roof system as required.
   1. Roof membrane manufacturer shall be present on the 1st day of roofing work.
   2. Roof membrane manufacturer shall make minimum bi-weekly site visits.

B. Notification of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Roof Inspection/Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.
   1. Notify Architect 48 hours in advance of date and time of inspection.

D. Repair or remove and replace components of roofing system where inspections indicate that they do 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.

F. Issuance of the Warranty: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified warranty.

3.21 CLEANING

A. Clean up and remove debris from roof deck and site on a daily basis and legally dispose at an approved disposal site.

B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Repair or replace defaced or disfigured finishes caused by the work of this Section.

3.22 PROTECTION

A. Restrict construction traffic and equipment movement on the completed roofing to only essential personnel.
   1. Provide appropriate protection against traffic and construction activities on completed roofs.

B. Where traffic must continue over finished roof membrane, protect surfaces.

C. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

D. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

E. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Formed Products:
   1. Formed roof drainage sheet metal fabrications.
   2. Formed low-slope roof sheet metal fabrications.
   3. Formed wall sheet metal fabrications.
   4. Formed equipment support flashing.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry: Wood nailers and blocking.
   2. Section 07 54 19- Polyvinyl-Chloride (PVC-KEE) Roofing System: Installing sheet metal flashing and trim integral with roofing membrane.
   3. Section 07 71 00 - Roof Specialties: Manufactured copings, edge fascia, reglets and counterflashings
   4. Section 07 72 00 - Roof Accessories: Set-on-type curbs and equipment supports; roof hatch.
   5. Section 07 92 00 - Joint Sealants: Field-applied sheet metal flashing and trim sealants.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
   3. Review requirements for insurance and certificates if applicable.
   4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
   1. Identification of material, thickness, weight, and finish for each item and location in Project.

2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
4. Details of termination points and assemblies, including fixed points.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
7. Details of special conditions.
8. Details of connections to adjoining work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified fabricator.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
   1. For copings and roof edge flashings that are SPRI ES-1 tested and approved, shop shall be listed as able to fabricate required details as tested and approved.

B. All anchorages shall meet SPRI ES-1 standards.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
   1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

D. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. SPRI Wind Design Standard (If applicable): Fabricate and install formed copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Prefinished Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
1. Exposed Coil-Coated Finishes:
a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Color: As selected by Architect from manufacturer's full range.
3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

C. Stainless-Steel Sheet: 26 gauge, ASTM A 240/A 240M or ASTM A 666, Type 304, dead soft, fully annealed; with smooth, flat surface, Finish: 2D (dull, cold rolled), terne coating, or brushed stainless. Confirm with Architect.

D. Copper Sheet: 16 oz.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. (Must be installed under all metal roofing with a slip sheet).
1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Basis-of-Design Product: GRACE CONSTRUCTION PRODUCTS; **"Ice & Watershield HT"**
   a. Approved Substitutions:
      1) Carlisle Coatings & Waterproofing; CCW WIP 300HT.
      2) Henry Company; Blueskin PE200 HT.
      3) Metal-Fab Manufacturing, LLC; MetShield.
      4) Owens Corning; WeatherLock Metal High Temperature Underlayment.
      5) Tamko; TW Metal and Tile Underlayment.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
   1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
      a. Exposed Fasteners: Heads matching color of sheet metal with factory-applied coating.
      b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
   2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
   3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
   4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel.

C. Solder:
   1. For Stainless Steel: ASTM B 32, Grade Sn60, with an acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.

D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by SMACNA's “Architectural Sheet Metal Manual” and by FMG Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams for Stainless Steel: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

H. Seams for Painted Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

I. Seams for Mill-Finish Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

J. Do not use graphite pencils to mark metal surfaces.

2.6 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with interlocking counterflashing on exterior face, of same metal as reglet.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Cheney Flashing Company.
      b. Fry Reglet Corporation.
      c. Heckmann Building Products Inc.
      d. Hickman, W. P. Company.

e. Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
f. Keystone Flashing Company, Inc.
g. National Sheet Metal Systems, Inc.
h. Sandell Manufacturing Company, Inc.

2. Material: Stainless steel, 0.019 inch thick.
3. Type: Use one of the following reglet types as applicable to substrate.
   a. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
   b. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
   c. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
   d. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
   e. Accessories:
      1) Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
      2) Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.
4. Finish: Mill.

2.7 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters (If required): Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
   1. Fabricate from the following exposed metal:
      a. Formed Prefinished Aluminum: Minimum 0.040 inch thick.
   2. Gutter Profile: As indicated, according to SMACNA's "Architectural Sheet Metal Manual."
   3. Corners: Shop-mitered and continuously welded or mechanically clinched and sealed watertight.
   4. Gutter Supports: Fabricator's standard supports as selected by Architect with finish matching the gutters.

B. Downspouts (if required): Rectangular downspouts, as indicated, complete with mitered or smooth-curve elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
   1. Fabricate from the following materials:
      a. Formed Prefinished Aluminum: Minimum 0.032 inch thick.

C. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper. Fabricate one of the following materials:
   1. Stainless Steel, 0.0187 inch thick.
   2. Formed Prefinished Aluminum: Minimum 0.040 inch thick.

D. Conductor Heads (If required): Fabricated conductor heads, each with flanged back and stiffened top edge and of dimensions and shape indicated, complete with outlet tube that nests into upper end of downspout, exterior flange trim, and built-in overflow.
1. Fabricate from one of the following exposed metals:
    a. Formed Prefinished Aluminum: Minimum 0.040 inch thick.

E. Splash Pans: Fabricate from the following exposed metal:
1. Stainless Steel: 0.019 inch thick.

2.8 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof Transition Flashings: Fabricate from the following materials:
1. Acceptable Materials:
    a. Prefinished Aluminum Sheet: 0.032" thick.
    b. Stainless Steel: 0.019 inch thick.

B. Base Flashing: Fabricate from the following materials:
1. Acceptable Materials:
    a. Prefinished Aluminum Sheet: 0.032" thick.
    b. Stainless Steel: 0.019 inch thick.

C. Counterflashing: Fabricate from the following materials:
1. Acceptable Materials:
    a. Prefinished Aluminum Sheet: 0.032" thick.
    b. Stainless Steel: 0.019 inch thick.

D. Flashing Receivers: Fabricate from the following materials:
1. Stainless Steel: 0.019 inch thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:
1. Acceptable Materials:
    a. Prefinished Aluminum Sheet: 0.032" thick.

2.9 WALL SHEET METAL FABRICATIONS

A. Openings Flashing in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high end dams.
1. Acceptable Materials: Flashing material type shall match adjacent metal.
    a. Prefinished Aluminum Sheet: 0.032" thick.
    b. Stainless Steel: 0.019 inch thick.

2.10 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:
1. Acceptable Materials: Flashing material type shall match adjacent metal.
    a. Prefinished Aluminum Sheet: 0.032" thick.
    b. Stainless Steel: 0.019 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
   4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
   5. Install sealant tape where indicated.
   6. Torch cutting of sheet metal flashing and trim is not permitted.
   7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
   1. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where

lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws, and metal decking not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as shown and as required for watertight construction.
   1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
   2. Prepare joints and apply sealants to comply with requirements in “Section 07 92 00 - "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
   1. Do not solder metallic-coated steel and aluminum sheet.
   2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
   3. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

H. Rivets: Rivet joints in uncoated aluminum where indicated and where necessary for strength.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
   1. Fasten gutter spacers to front and back of gutter.
   2. Anchor and loosely lock back edge of gutter to continuous cleat.
   3. Anchor gutter with gutter brackets or straps spaced not more than 24 inches apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
   4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
   5. Install prefabricated downspout outlets with solid flanges.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.
   1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.

2. Provide elbows at base of downspout to direct water away from building or connect downspouts to underground drainage system.

D. Splash Pans: Install where downspouts discharge onto low-slope roofs. Set in elastomeric sealant compatible with the substrate.

E. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
1. Anchor scupper closure trim flange to exterior wall continuously around scupper and solder or seal with elastomeric sealant to scupper with caulk tray.

F. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below scupper or gutter discharge.

G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of interlocking folded seam or blind rivets and sealant.

D. Roof-Penetration Flashing: Coordinate installation of pipe or post flashings with installation of roofing and other items penetrating roof. Seal roof penetrations in accordance with “Section 07 54 23 - Thermoplastic Polyolefin (TPO) Roofing.”

E. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.9 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 00

ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Manufactured roof specialties:
   1. Roof edge fascia.
   2. Reglets and counterflashings.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry: Wood nailers, curbs, and blocking.
   2. Section 07 54 19 - Polyvinyl-Chloride (PVC-KEE) Roofing System: Roof penetration flashings.
   3. Section 07 62 00 - Sheet Metal Flashing and Trim: Site-fabricated sheet metal flashing and trim.
   4. Section 07 72 00 - Roof Accessories: Curbs and equipment supports.
   5. Section 07 92 00 - Joint Sealants: Field-applied sealants.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
   1. Design Pressure: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings for Roof Specialties: Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant & field-assembled work. Include the following:
   1. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
   2. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.
   3. Details of termination points and assemblies, including fixed points.
   4. Details of special conditions.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

D. Samples for Verification: For copings, roof-edge flashings, roof-edge drainage systems, reglets and counterflashings made from 12-inch lengths of full-size components including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for copings and roof-edge flashings.

B. Warranty: Sample of warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical roof edge, including coping, fascia, gutters and downspouts approximately 10 feet long, including supporting construction, seams, attachments, underlayment, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Preinstallation Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.
2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.8 COORDINATION

A. Coordinate application of the prefabricated roof specialties with the application of wood nailers, adjacent materials and components in such a manner that the complete installation is weathertight and in accordance with warranty requirements.

1.9 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED METALS

A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
   1. Surface: Smooth, flat finish.
   2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
      b. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
   1. Exposed High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Two-Coat Fluoropolymer: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

2.2 CONCEALED METALS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Stainless-Steel Sheet: ASTM A 240, Type 304.

D. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.

2.3 UNDERLAYMENT MATERIALS (For Incidental Use)

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
   1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F.

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Basis-of-Design Product: GRACE CONSTRUCTION PRODUCTS; **"Ice & Watershield HT"**
   a. Approved Substitutions:
      1) Carlisle Coatings & Waterproofing; CCW WIP 300HT.
      2) Henry Company; Blueskin PE200 HT.
      3) Metal-Fab Manufacturing, LLC; MetShield.
      4) Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Aluminum: Series 300 stainless steel.
3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel.

C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application. Refer to "Section 07 92 00 - Joint Sealants."

D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED COPINGS (If Required)

A. Manufactured Aluminum Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; mitered corner units, end cap units, straight & factory-radiused units, and concealed splice plates with same finish as coping caps.
1. Available Manufacturers:
   a. Architectural Products Co.
   b. ATAS International, Inc.
   c. Castle Metal Products.
   d. Cheney Flashing Company.
   e. Hickman, W. P. Company.
   f. Metal-Era, Inc.
   g. Metal-Fab Manufacturing LLC.
   h. MM Systems Corporation.
   i. Perimeter Systems, a division of Southern Aluminum Finishing Co.
   j. Petersen Aluminum Corp.
2. Coping Caps: Snap-on, fabricated from extruded aluminum; Minimum 0.050 inch thick.
3. Coping Cap Color: As selected by Architect from manufacturer's full range.
4. Mitered Corners: Continuously welded or lapped, riveted, and sealed.

5. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, with integral cleats.

2.6 MANUFACTURED ROOF EDGE FASCIA

A. Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed- or extruded-aluminum anchor bar with integral drip edge cleat to engage fascia cover. Provide straight & factory-radiused units with concealed splice plates.
   1. Available Manufacturers:
      a. Architectural Products Co.
      b. ATAS International, Inc.
      c. Castle Metal Products.
      d. Cheney Flashing Company.
      e. Hickman, W. P. Company.
      f. Metal-Era, Inc.
      g. Metal-Fab Manufacturing LLC.
      h. MM Systems Corporation.
      i. Perimeter Systems, a division of Southern Aluminum Finishing Co.
      j. Petersen Aluminum Corp.
   2. Fascia Cover: Fabricated from formed or extruded aluminum: minimum 0.040 inch thick.
   3. Fascia Cover Color: As selected by Architect from manufacturer's full range.
   4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
   5. Mitered Corners: Continuously welded or lapped, riveted, and sealed.

2.7 REGLETS AND COUNTERFLASHINGS

A. Available Manufacturers:
   1. Castle Metal Products.
   2. Cheney Flashing Company.
   3. Fry Reglet Corporation.
   4. Hickman, W. P. Company.
   5. Keystone Flashing Company.
   6. Metal-Era, Inc.
   7. Metal-Fab Manufacturing, LLC.
   8. MM Systems Corporation.
   9. National Sheet Metal Systems, Inc.

B. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashings indicated, from the following exposed metal in thickness indicated:
   1. Stainless Steel: 0.0187 inch thick.
   2. Corners: Factory mitered and mechanically clinched and sealed watertight.
   3. Type: Use one of the following reglet types as applicable to substrate.
      a. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge. (Use only with Architect’s approval where embedded reglets cannot be used)
      b. Stucco Type, Embedded: Provide reglets with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
      c. Concrete Type, Embedded: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.

d. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
e. Multiuse Type, Embedded: For multiuse embedment in cast-in-place concrete or masonry mortar joints.

C. Counterflashings: Manufactured units in lengths not exceeding 12 feet designed to snap into reglets and compress against base flashings with joints lapped, from the following exposed metal in thickness indicated:
1. Stainless Steel: 0.0250 inch thick.

D. Accessories:
1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.8 GENERAL FINISH REQUIREMENTS

A. "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
1. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective

coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise shown on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints with elastomeric or butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.4 COPING INSTALLATION (If Required)

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 ROOF-EDGE FLASHING INSTALLATION

A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.6 REGLET AND COUNTERFLASHING INSTALLATION

A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.

B. Embedded Reglets (if applicable): See “Section 03 30 00 - Cast-in-Place Concrete” for installation of reglets.

C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.

D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric or butyl sealant. Fit counterflashings tightly to base flashings.
   1. Seal all exposed interior and exterior corners with elastomeric sealant.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Roof curbs and equipment supports.
2. Pipe supports.
3. Factory-fabricated roof hatch.

B. Related Sections:
1. Section 06 10 00 - Rough Carpentry: Wood nailers and blocking for roofing work.
2. Section 07 54 19 - Polyvinyl-Chloride (PVC-KEE) Roofing: Installation of flashings and roof penetrations.
3. Section 07 62 00 - Sheet Metal Flashing and Trim: Shop-and field-fabricated metal flashing and counterflashing, and miscellaneous sheet metal trim and accessories.
4. Section 07 92 00 - Joint Sealants: Sealants for roofing work.

1.2 COORDINATION

A. Coordinate roof curbs, pipe supports, and equipment supports with mechanical, electrical and plumbing equipment provided for this project.

B. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes or roof expansion joints.

C. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Delegated-Design Submittal: For roof curbs and equipment supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
2. Wind-Restraint Details: Detail fabrication and attachment of wind restraints. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
   1. Size and location of roof accessories specified in this Section.
   2. Method of attaching roof accessories to roof or building structure.
   3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
   4. Required clearances.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer to design roof curbs and equipment supports to comply with wind performance requirements, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Wind-Restraint Performance: As indicated on Drawings.

2.2 MISCELLANEOUS MATERIALS

A. Aluminum:
   1. Sheet: ASTM B 209 for alclad alloy 3005H25 or alloy and temper required to suit forming operations, with mill finish, unless otherwise indicated.
   2. Extrusions: ASTM B 221 alloy 6063-T52 or alloy and temper required to suit structural and finish requirements, with mill finish, unless otherwise indicated.

B. Galvanized Steel Sheet: ASTM A 653 with G90; commercial steel, unless otherwise indicated.
   1. Structural Quality: Grade 40, where indicated or as required for strength.

C. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792 with Class AZ-50 coating, structural quality, Grade 40, or as required for strength.

D. Insulation: ASTM C 726, nominal density of 3 lb/cu. ft., thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F, thickness as indicated, but not less than 1 ½" thick.

E. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA C2; not less than 1-1/2 inches thick.

F. Fasteners: All fasteners shall be 300 Series stainless steel.

G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

H. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coating.

I. Elastomeric Sealant: Silicone in accordance with "Section 07 92 00 - Joint Sealants.

J. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

K. Roofing Cement (Only for with bituminous roofing membranes): ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive compatible with roofing system.

2.3 ROOF CURBS AND EQUIPMENT SUPPORTS

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. AES Industries, Inc.
2. Curbs Plus, Inc.
3. Custom Solution Roof and Metal Products.
4. Greenheck Fan Corporation.
5. LM Curbs.
6. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
7. Pate Company (The).
8. Roof Products, Inc.
9. Thybar Corporation.
10. Vent Products Co., Inc.

B. General: Units capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported. Coordinate dimensions with equipment to be supported.
1. Provide preservative-treated wood nailers at tops of units and formed flange at perimeter bottom for mounting to roof.
2. Where slope of roof deck exceeds 1/4 inch per foot, fabricate support units with height tapered to match slope to level tops of units.

C. Roof Curbs:
1. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 16 gage, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.
2. Insulation: Factory insulated with 1 ½" glass-fiber board insulation.
3. Curb Design: Box-type without built-in cants.
4. Heights: Fabricate units to minimum height of 18 inches, unless otherwise indicated. Top of curbs shall be minimum 12" above roof membrane surface.
5. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.

D. Equipment Supports: Capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported.
1. Size of curbs and required options shall be coordinated by curb manufacturer and General Contractor prior to fabrication.
2. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 14 gage, structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting with welded or sealed mechanical corner joints.

3. Insulation: Factory insulated with 1 ½" glass-fiber board insulation.
4. Heights: Fabricate units to minimum height of 18 inches, unless otherwise indicated. Top of curbs shall be minimum 12" above roof membrane surface.
5. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
6. Shop Drawings bearing Architect's approval shall be used for fabrication of curbs.

2.4 PIPE AND DUCT SUPPORTS

A. Fixed-Height Cradle-Type Pipe Supports: Polycarbonate pipe stand accommodating up to 1-1/2-inch- (38-mm-) diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.

B. Fixed-Height Roller-Bearing Pipe Supports: Polycarbonate pipe stand with polycarbonate or stainless-steel roller carrying assembly accommodating up to 7-inch- (178-mm-) diameter pipe or conduit; with provision for pipe retainer and with manufacturer's support pad or deck plate as recommended for penetration-free installation over roof membrane type; as required for quantity of pipe runs and sizes.

C. Curb-Mounted Pipe Supports: Galvanized steel support with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom; with adjustable-height roller-bearing pipe support accommodating up to 20-inch- (508-mm-) diameter pipe or conduit and with provision for pipe retainer; as required for quantity of pipe runs and size.

2.5 ROOF HATCH

A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids and insulated double-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
1. Basis of Design Products/Manufacturers: Roof hatch system is based on **"Type S-50TB Roof Hatch, 30" x 36",** as manufactured by THE BILCO COMPANY.
    a. Approved Substitutions:
        1) Babcock-Davis; a Cierra Products Inc. Company.
        2) Dur-Red Products.
        3) Milcor Inc.; a Gibraltar Company.
2. Loads: Fabricate roof hatches to withstand 40-lbf/sq. ft. with a maximum deflection of 1/150th of the span or 20 psf (97kg/m2) wind uplift.
3. Type and Size: Single-leaf lid, 36" x 36" single leaf lid.
4. Thermal Break: Cover and curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
5. Curb and Lid Material: Mill finish aluminum sheet, minimum 11 gauge with a 3" beaded flange with formed reinforcing members
6. Insulation: 1" thick rigid, high-density fiberboard.
7. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
8. Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
9. Lid Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
10. Fabricate units to minimum height of 12 inches, unless otherwise indicated.
11. Galvanized steel hardware is standard; stainless steel may be available for corrosive environments. Verify availability with manufacturers.

12. Hardware: Stainless-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

2.6 ROOF ACCESS HATCH PROTECTION RAILING

A. Provide OSHA compliant fall protection rails for existing roofing hatch: aluminum railing, 1 ¼" schedule 40, 6061 T6 alumiinum. with powder coat paint finish with self-closing and latching gate, non-roof penetrating attachment (direct attachment to hatch curb). Provide type to match door side-swing type of access hatch. **Bil-Guard Hatch Railing System RL-F by Bilco** or equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.
1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of uncoated aluminum and stainless-steel roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.

D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.

E. Roof-Hatch Installation:
1. Install roof hatch so top surface of hatch curb is level.

2. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
3. Coordinate installation of ladder with installation of roof hatch.

F. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item.

G. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.

H. Roof Penetration Flashings: Install in accordance with "Section 07 52 00 - Modified Bitumen Roofing."

I. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

J. Seal joints with silicone or butyl sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to "Section 09 91 00 - Painting."

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 - GENERAL

SUMMARY

Section Includes: Firestop systems consisting of a material, or combination of materials installed to retain the integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and/or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to fire-rated barriers in accordance with the requirements of the Building Code for this project.

Firestop systems shall be used in locations including, but not limited to, the following:

1. Penetrations through fire-resistance-rated floor and roof assemblies requiring protected openings including both empty openings and openings that contain penetrations.
2. Penetrations through fire-resistance-rated wall assemblies including both empty openings and openings that contain penetrations.
3. Membrane penetrations in fire-resistance-rated wall assemblies where items penetrate one side of the barrier.
4. Joints in fire-resistance-rated assemblies to allow independent movement.
5. Perimeter Fire Barrier System between a rated floor/roof and an exterior wall assembly.
6. Joints, through penetrations and membrane penetrations in Smoke Barriers and Smoke Partitions.

Related Sections:

7. Section 07 92 00 - Joint Sealants: Interior and exterior sealants.
8. Section 09 29 00 - Gypsum Board: Acoustical sealant.

REFERENCES

Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

9. American Society for Testing and Materials (ASTM).
    a. E 84 Test Method for Surface Burning Characteristics of Building Materials
    b. E 119 Test Method for Fire Tests of Building Construction and Materials
    c. E 136 Test Method for Behavior of Materials in a Vertical Tube Furnace at 750F
    d. E 814 Fire Tests of Through-Penetration Fire Stops
    e. E 1399 Cyclic Movement and Measuring Minimum and Maximum Joint Widths
    f. E 1966 Test Method for Resistance of Building Joint
    g. E 2174 Standard Practice for On-Site Inspection of Installed Fire Stops
    h. E 2393 Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems
    i. E 2307 Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using the Intermediate-Scale, Multi Story Test Apparatus (ISMA)
10. Factory Mutual (FM) Research:
    a. FM Approval Standard of Firestop Contractors – Class 4991
11. Firestop Contractors International Association (FCIA):
    a. M.O.P. Manual of Practice
12. International Firestop Council (IFC):
    a. Ref. 1 Recommended IFC Guidelines for Evaluating Firestop Engineering Judgments (April 2001)
    b. Ref. 2 Inspectors Field Pocket Guide

13. National Fire Protection Association (NFPA):
    a. NFPA 70 - National Electric Code
    b. NFPA 101 - Life Safety Code
    c. NFPA 221 - Fire Walls and Fire Barriers (preliminary to be released)
    d. NFPA 251 - Fire Tests of Building Construction and Materials
14. Underwriters Laboratories, Inc. (UL):
    a. UL Qualified Firestop Contractor Program
    b. UL 263 Fire Tests of Building Construction and Materials
    c. UL 723 Surface Burning Characteristics of Building Materials
    d. UL 1479 Fire-Tests of Through-Penetration Fire Stops
    e. UL 2079 Tests for Fire Resistance of Building Joint Systems

SYSTEM PERFORMANCE REQUIREMENTS

Penetrations: Provide and install firestopping systems that are produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:

15. Firestop all penetrations passing through fire resistance rated wall and floor assemblies and other locations as indicated on the drawings.
16. Provide and install complete penetration firestopping systems that have been tested and approved by third party testing agency.
17. F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than one hour or the fire-resistance rating of the construction being penetrated.
18. T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated by Code.
19. L – Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated by Code.
20. (Optional) W – Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined per UL 1479, where indicated.

Perimeter Fire Containment Systems: Provide interior perimeter joint systems with fire-resistance ratings indicated, as determined per ASTM E 2307, but not less than the fire-resistance rating of the floor construction.

Fire-Resistive Joints: Provide joint systems with fire-resistance ratings indicated, as determined per UL 2079, but not less than the fire-resistance rating of the construction in which the joint occurs.

For firestopping exposed to view, traffic, moisture, and physical damage, provide appropriate firestop systems for these conditions.

Where there is no specific third party tested and classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFFRA) for submittal.

SUBMITTALS

Product Data: Submit Manufacturers Product Data Sheets for each type of product selected. Certify that Firestop Material is asbestos free and complies with local regulations.

21. Certification by firestopping manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's) and are nontoxic to building occupants.

System Designs: Submit system design listings, including illustrations from a qualified testing and inspection agency that is applicable to each firestop configuration.

22. Where there is no specific third party tested and classified Firestop System available for particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal.

Installer's Qualifications: Submit contractor qualifications as noted in "Quality Assurance" article.

QUALITY ASSURANCE

Fire-Test-Response Characteristics: Provide firestopping System Design Listing by a testing and inspection agency in accordance with the appropriate ASTM Standard(s) per article 1.3.

23. Qualified testing and inspection agencies are UL, FM Research, Intertek Testing Services, Omega Point Laboratories (OPL) or another agency performing testing and follow-up inspection services for firestop materials that is acceptable to the authority having jurisdiction.

Manufacturers: Firestop products shall be produced by FCIA Manufacturer Members in good standing.

Contractor Qualifications: Acceptable installer firms shall be:

24. FM Approved in accordance with FM Standard 4991 – Approval of Firestop Contractors.
25. UL Qualified Firestop Contractor.
26. Firestop Contractors International Association Contractor Member in good standing.
27. Licensed by the State or local authority, where applicable.
28. Shown to have successfully completed not less than 5 comparable scale projects.

Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.

29. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
30. Tested and listed firestop systems shall be used before an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) is installed.

Field Constructed Mockup: Prior to installing firestopping, erect mockups for each different firestop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.

31. Locate mockups on site in locations indicated or, if not indicated, as directed by Architect. Include mockup for each type of system.
32. Notify Architect in advance of the dates and times when mockups will be installed.
33. Obtain Architect's acceptance of mockups before start of Work.
34. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work. Accepted mockups in an undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

DELIVERY, STORAGE, AND HANDLING

Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer.

Store and handle firestopping materials in accordance with manufacturers written instructions.

PROJECT CONDITIONS

Environmental Conditions: Install firestopping in accordance with manufacturers written instructions.

Ventilation: Ventilate per firestopping manufacturers' instructions or Material Safety Data Sheet (MSDS)

SEQUENCING AND SCHEDULING

Pre-Installation Meeting: Schedule a pre-construction meeting to inform and educate all parties involved with the firestopping process of their role on the project.

Do not cover up firestopping installations until Owner's inspection agency or the Authorities Having Jurisdiction have examined each installation.

ENVIRONMENTAL REGULATIONS

All materials shall be asbestos free and comply with local VOC Regulations.

If required, hazardous disposal of firestop materials shall be strictly observed as noted on the individual MSDS.

PART 2 - PRODUCTS

FIRESTOPPING

Approved Manufacturers: Manufacturer of firestop products shall have been successfully producing and supplying firestopping products for a period of not less than five (5) years, and be able to show evidence of at least 10 projects where similar products have been installed and accepted.

Firestopping Systems: Systems listed by approved testing agencies, as identified in Part 1 above, may be used, providing they conform to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance.

Firestop products produced by FCIA Manufacturer Members in good standing.

1. 3M Fire Protection Products
2. Boss Products, Inc.
3. W.R. Grace Construction Products
4. HILTI, Inc.
5. RectorSeal.
6. Specified Technologies, Inc.
7. Tremco, Inc.
8. Thermafiber, LLC

PART 3 - EXECUTION

EXAMINATION

Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of firestopping. Notify the responsible party or parties of any unsatisfactory conditions. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION

Priming: Prime substrates where recommended by firestopping manufacturer using manufacturer's recommended products and methods. Confine primers to areas of bond. Do not allow spillage and migration onto exposed surfaces.

Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as possible without disturbing the firestopping seal or substrate.

Verify that system components are clean, dry, and ready for installation.

Verify that field dimensions are as shown on the Drawings and as recommended by the manufacturer.

INSTALLING PENETRATION FIRESTOPS

General: Comply with the "System Performance Requirements" article in Part 1 and the through-penetration firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

1. Coordinate with other trades to assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed prior to installation of firestop assemblies.
2. Schedule the work to assure that partitions and all other construction that conceals penetrations are not erected prior to the installation of firestop and smoke seals.

Install forming/damming materials and other accessories in accordance with manufacturer’s written instructions.

Install fill materials for through-penetration firestop systems by proven techniques to produce the following results:

3. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
4. Install materials so they contact and adhere to substrates formed by openings and penetrating items.
5. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces.

INSTALLING FIRESTOP JOINT SYSTEMS

General: Comply with the "System Performance Requirements" article in Part 1 and with the firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.

6. Install joint fillers to provide support of firestop materials during application and at the position required to produce the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.

Install systems by proven techniques that result in firestop materials:

7. directly contacting and fully wetting joint substrates.
8. completely filling recesses provided for each joint configuration,
9. providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.

Tool non-sag firestop materials immediately after application and prior to skinning. Form smooth, uniform beads of configuration indicated or required to:

10. produce fire-resistance rating
11. to eliminate air pockets

12. to ensure contact and adhesion with sides of joint.

INSTALLING PERIMETER FIRE BARRIER SYSTEMS

General: Comply with “System Performance Requirements” article in Part 1 and with the firestop manufacturer’s installation instructions and drawings pertaining to products and applications indicated.

Install metal framing, curtain wall insulation, mechanical attachments, safing materials and firestop materials as applicable within the system design.

FIELD QUALITY CONTROL

Inspection: Independent inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E – 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops and ASTM E-2393, “Standard Practice for On-Site Inspection of Installed Fire Stop Joint Systems.

13. Inspection agency will examine firestopping to verify that firestopping has been installed in compliance with requirements of tested and listed firestop system, and installation process conforms to FM 4991 – Standard for Approval of Firestop Contractors or UL Qualified Firestop Contractor Program.

The inspector shall advise the Contractor of any deficiencies noted within one (1) working day.

Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.

Where deficiencies are found, repair or replace firestopping so that it complies with requirements of tested and listed system design.

CLEANING

Clean off excess fill materials and sealants adjacent to openings and joints as work progresses.

14. Use methods and cleaning materials approved by manufacturers of firestopping products and or assemblies in which openings and joints occur.

Protect firestopping during and after curing period from contact with contaminating substances.

15. Repair damage caused by others, and charge to appropriate trades.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Nonstaining silicone joint sealants.
2. Urethane joint sealants.
3. Mildew-resistant joint sealants.
4. Butyl joint sealants.
5. Latex joint sealants.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

C. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:

1. Joint-sealant location and designation.
2. Manufacturer and product name.
3. Type of substrate material.
4. Proposed test.
5. Number of samples required.

D. Preconstruction Laboratory Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.

E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

F. Field-Adhesion-Test Reports: For each sealant application tested.

G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.

C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with stone and masonry substrates.

4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
   a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

      1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

4. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
5. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

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

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period:
   a. Five years from date of Substantial Completion for Polyurethane Joint Sealants.
   b. Twenty years from date of Substantial Completion for Silicone Joint Sealants.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Verify sealants and sealant primers comply with the following:

1. Architectural sealants have a VOC content of 250 g/L or less.
2. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
   b. Pecora Corporation; Pecora 890NST.
   c. The Dow Chemical Company; Dowsil 790 Silicone Building Sealant.
   d. Tremco Commercial Sealants & Waterproofing; Spectrem 1.

C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. GE Construction Sealants; Momentive Performance Materials Inc.; Silpruf NB.
   b. Pecora Corporation; Pecora 864NST or Pecora 895NST.
   c. The Dow Chemical Company; Dow Corning® 795 Silicone Building Sealant.
   d. Tremco Incorporated; Spectrem 2.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, minimum plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, minimum Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Corporation; MasterSeal CR 195.
   b. Pecora Corporation; Dynatrol I-XL.
   c. Sika Corporation; Joint Sealants; Sikaflex -1A.
   d. Tremco Incorporated; Dymonic.

B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. BASF Corporation; MasterSeal CR 195.
   b. Pecora Corporation; NR-201.
   c. Sherwin-Williams Company (The); Stampede 1SL.

C. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:

   a. LymTal International Inc; Iso-Flex 888QC.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
   b. Pecora Corporation; Pecora 860.
   c. The Dow Chemical Company; DOW CORNING® 786 SILICONE SEALANT.
   d. Tremco Incorporated; Tremsil 200.

2.5 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C1311.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Bostik, Inc; Chem-Calk 300.
   b. Pecora Corporation; BC-158.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Bostik, Inc.; Bosti-Flex Plus.
   b. Pecora Corporation; AC-20.
   c. Tremco Incorporated; Tremflex 834.

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Adfast; Adseal BR 2600.
   b. Alcot Plastics Ltd.; [ALCOT Soft Type Backer Rod][ALCOT Standard Backer Rod].
   c. BASF Corporation; MasterSeal 920 & 921(Pre-2014: Sonolastic Backer Rod).
   d. Construction Foam Products; a division of Nomaco, Inc.; HBR.

B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
   a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
   b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:
   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
   a. Control and expansion joints in brick pavers.
   b. Isolation and contraction joints in cast-in-place concrete slabs.
   c. Joints between plant-precast architectural concrete paving units.
   d. Joints in stone paving units**,** including steps.
   e. Tile control and expansion joints.
   f. Joints between different materials listed above.
   g. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, M, P, 50, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
   a. Construction joints in cast-in-place concrete.
   b. Joints between plant-precast architectural concrete units.
   c. Control and expansion joints in unit masonry.
   d. Joints in dimension stone cladding.
   e. Joints in glass unit masonry assemblies.
   f. Joints in exterior insulation and finish systems.
   g. Joints between metal panels.
   h. Joints between different materials listed above.
   i. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
   j. Control and expansion joints in ceilings and other overhead surfaces.
   k. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 100/50 and 50, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:
   a. Isolation joints in cast-in-place concrete slabs.
   b. Control and expansion joints in stone flooring.
   c. Control and expansion joints in brick flooring.
   d. Control and expansion joints in tile flooring.
   e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 25, T, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Tile control and expansion joints.
   c. Vertical joints on exposed surfaces of unit masonry, concrete, walls, and partitions.

d. Joints on underside of plant-precast structural concrete beams and planks.
e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:
   a. Control joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:
   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:
   a. Aluminum thresholds.
   b. Sill plates.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

PART 4 -

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior Steel Doors: Interior flush steel doors; fire-rated and non-fire-rated, factory-primed, field finished.
2. Exterior Steel Doors: Flush steel doors; non-fire-rated, galvanized, field finished.
3. Interior Steel Frames: Fire-rated and non-fire-rated welded units, pressed steel frames for steel and wood doors; factory-primed, field finished.
4. Exterior Steel Frames: Non-fire-rated welded units, pressed steel frames for steel doors; galvanized, field finished.

B. Related Sections:
1. Section 08 14 16 - Flush Wood Doors.
2. Section 08 31 13 - Access Doors and Frames.
3. Section 08 71 00 - Door Hardware: Door hardware for steel doors.
4. Section 08 81 00 - Glass Glazing: Glass for door lights and borrowed lights.
5. Section 09 91 00 - Painting: Field painting of steel doors and frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.3 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.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating, temperature-rise ratings, and finish for each type of steel door and frame specified.

B. 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 each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Fire-Rated Door 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.
1. Oversize Fire-Rated Door Assemblies: 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. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

C. 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 at positive pressure according to NFPA 257 or UL 9. Label each individual glazed lite.

D. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

1.8 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 nonvented plastic.
1. Provide additional protection to prevent damage to finish of factory-finished units.

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.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

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. Ambico Limited.
2. Amweld Building Products, LLC.
3. Benchmark; a division of Therma-Tru Corporation.
4. Ceco Door Products; an ASSA ABLOY Group Company.
5. CURRIES Company; an ASSA ABLOY Group Company.
6. Mesker Door Inc.
7. Pioneer Industries.
8. Steelcraft; an Ingersoll-Rand Company.
9. Windsor Republic Doors.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 101, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Frame Anchors: ASTM A 591, Commercial Steel (CS), 4 0Z coating designation; mill phosphatized.
1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008 or ASTM A 1011, hot-dip galvanized according to ASTM A 153, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching standard steel door frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in “Section 08 81 00 - Glass Glazing.”

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 HOLLOW METAL DOORS

A. General: Provide 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.
1. Design: Flush panel.

C. Interior Steel Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level.
1. Performance Level: Level 3 and Physical Performance Level A (Extra Heavy Duty), Model Full Flush.
2. Door Face Sheets: Fabricate from minimum 16 gage (0.053-inch) thick, cold-rolled steel sheet.
3. Core Construction: Manufacturer's standard vertical steel-stiffener core that produces doors complying with ANSI A250.8.
4. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
5. Vertical Edges for Single-Acting Doors: Beveled Edge; 1/8 inch in 2 inches.
6. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick end closures or channels of same material as face sheets.

D. Exterior Steel Doors: Face sheets fabricated from metallic-coated steel sheet, G60 or 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. Performance Level: Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless) and Model 3 (Stile and Rail) as indicated.
2. Door Face Sheets: Fabricated from minimum 16 gage (0.053-inch) thick, metallic-coated steel sheet.
3. Core: Foamed-In-Place polyurethane or polyisocyanurate board, as standard with manufacturer; minimum R-value of 14.
4. Top and Bottom Channels: Minimum 0.053-inch-thick, steel channel spot welded, not more than 6 inches o.c., to face sheets.
    a. Tops and bottoms of doors reinforced with inverted horizontal channels, continuous across full width of door, of same material as face sheets so flanges of channels are even with bottom and top edges of face sheets.
    b. Top and bottom edges of exterior doors closed with closing channels of same material and thickness as face sheets; welded so webs of channels are flush with door edges.

E. Interior and Exterior Doors with Full Glass, Half Glass or Double Glass (If required):
1. 1 3/4” insulated tubular seamless construction rated for extra heavy-duty use.
2. 16 gauge, galvannealed fully reinforced construction.
3. Hinge Reinforcement: Not less than 7 gage (3/16”) plate 1-1/4” X 9”, or a 12 gage continuous channel with formed holes drilled and tapped. Manufacturer shall provide test information with submittal that this type reinforcement is equal to a 3/16” or 7-gage plate reinforcement.
4. 5 5/8” stiles, top and center rail. 12” bottom rail.
5. Integral flush glazing.
6. Flush tubular steel door top.
7. 7 gage steel hinge reinforcements.

F. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
   1. Hinge: Minimum 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
   2. Lock Face, Closers, and Concealed Holders: Minimum 0.093 inch thick.
   3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.

2.4 HOLLOW METAL FRAMES

A. General: Fabricate frames of construction indicated. Close contact edges of corner joints tight with faces mitered and stops butted or mitered. Continuously weld faces and soffits and finish faces smooth. Comply with ANSI/SDI A250.8.

B. Interior Frames: Fabricate from minimum 16 gage (0.053-inch) thick cold-rolled steel sheet.
   1. Construction: Fully welded.

C. Exterior Frames: Fabricate from minimum 16 gage (0.053-inch) metallic-coated thick steel sheet.
   1. Construction: Fully welded.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as frame.

E. Head Reinforcement: Provide minimum 0.093-inch thick, steel channel or angle stiffener for opening widths more than 48 inches.

F. Wiring Harness: Where indicated, install a wiring harness into hollow metal frame.

2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042” thick.
   3. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
   4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

2.6 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

2.7 LOUVERS

A. Provide louvers for interior doors, where indicated, that comply with SDI 111C, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch- thick steel frame.
   1. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y-shaped blades.
   2. Fire-Rated Automatic Louvers: Where indicated, louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing and inspecting agency that established fire-resistance rating of door assembly.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.9 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances:
   1. Standard Hollow Metal Work: Fabricate to tolerances indicated in SDI 117
   2. Custom Hollow Metal Work: Fabricate to tolerances indicated in ANSI/NAAMM-HMMA 861.

C. Hollow Metal Doors:
   1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
   2. Glazed Lites: Factory cut openings in doors.
   3. Astragals: Provide overlapping astragal 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.

D. Hollow Metal Frames: 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.
   1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Install thermal break at exterior frames.
   2. 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.
   3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. 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.
   c. Compression Type: Not less than two anchors in each jamb.
   d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in "Section 08 71 00 - Door Hardware."
   1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8 or ANSI/NAAMM-HMMA 861 as required.
   2. Reinforce doors and frames to receive nontemplated, 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.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
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; compatible with substrate and field-applied coatings despite prolonged exposure.

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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. 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 to the following tolerances:
1. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, 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.
   1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
      a. At fire-protection-rated openings, install frames according to NFPA 80.
      b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
      c. Install frames with removable glazing stops located on secure side of opening.
      d. Install door silencers in frames before grouting.
      e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
      f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
      g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
      a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
   3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
   4. In-Place Metal Stud Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb or slip-on drywall frames as indicated. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
   5. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
   6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
      a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
      b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
      c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
      d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

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.
   3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in “Section 08 81 00 - Glass Glazing" and with hollow metal manufacturer's written instructions.
   1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Solid core doors with wood-veneer faces and factory finishing; stained finish.
2. Factory fitting wood doors to frames and factory machining for hardware.

B. Related Sections:
1. Section 08 11 13 - Hollow Metal Doors and Frames: Steel frames for flush wood doors.
2. Section 08 71 00 - Door Hardware.
3. Section 08 81 00 - Glass Glazing: Glass and glazing for doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of door. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details; location and extent of hardware blocking; mortises, holes, and cutouts; requirements for veneer matching; factory finishing; fire ratings; and other pertinent data.

C. Samples for Verification:
1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors from a single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
1. Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Oversize Fire-Rated Door Assemblies: 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. Temperature-Rise Limit: Where indicated, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door on top and/or bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operational and reasonable construction condition exists as not to affect the performance or warranty of the wood doors.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers:
1. VT Industries; Eggers Architectural Door Division.
2. GRAHAM Architectural Products.
3. IPIK Door Company.
4. Masonite Architectural, Inc.

B. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

2.2 FLUSH WOOD DOORS FOR TRANSPARENT FINISH

A. Interior Non-Fire-Rated Doors for Transparent Finish:
1. Size: 1 ¾” thick by size indicated on Drawings.
2. Grade: AWI Custom Grade, A faces.
3. Species and Cut: **Plain-sliced Walnut** to match Architect’s control sample.
4. Construction: AWI PC-5.
5. Bonding: Stiles and rails bonded to core, and then entire unit abrasively planed before veneering. Faces shall be bonded to core using a hot press.

B. Interior Fire-Rated Doors for Transparent Finish:
1. Size: 1 ¾" thick by size indicated on Drawings.
2. Grade: AWI Custom Grade, A faces.
3. Species and Cut: **Plain-sliced Walnut** to match Architect's control sample.
4. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as needed to provide fire rating indicated.
   a. Edge Construction: Intumescent seals concealed by outer stile matching face veneer, and laminated backing for improved screw-holding capability and split resistance.
   b. Blocking: For mineral-core doors, provide composite blocking designed to maintain fire-resistance of door but with improved screw-holding capability to eliminate the through-bolting of hardware and of same thickness as core and with minimum dimensions as follows:
      1) 5 inch top rail blocking.
      2) 5-inch bottom-rail blocking, in doors indicated to have kickplates.
      3) 5 inch midrail blocking (only at doors scheduled to receive panic devices)
5. Pairs: Provide fire-rated pairs with fire-retardant stiles matching face veneer that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

C. Veneer Matching:
1. Match between Veneer Leaves: Book match.
2. Assembly of Veneer Leaves on Door Faces: Running match.
3. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

2.3 LIGHT FRAMES

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.
1. Wood Species: Species compatible with door faces.
2. Profile: Manufacturer's standard shape.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Metal Frames for Light Openings in Fire-Rated Doors: 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.

2.4 LOUVERS (If Required)

A. Metal Louvers:
1. Blade Type: Vision-proof, inverted V or Y.
2. Metal and Finish: Extruded aluminum with dark bronze, Class II, color anodic finish, AA-M12C22A32/A34.

2.5 FABRICATION

A. Fabricate doors in sizes indicated for Project-site fitting.

B. Adhesives: Do not use adhesives containing urea formaldehyde.

C. Particleboard: Do not use particleboard made with binder containing urea-formaldehyde resin.

D. Factory machine doors for hardware that is not surface applied.
   1. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

E. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

A. General: Finish doors at factory in accordance with AWI Section 1500 “Factory Finishing.” Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   1. Finish faces, all four edges, edges of cutouts, and mortises.

B. Transparent Finish:
   1. Grade: Custom.
   2. Finish: AWI conversion varnish or catalyzed polyurethane system to match Architect’s control sample.
   3. Staining: Match Architect's control sample.
   4. Sheen: Match Architect’s control sample or selected from woodworkers standard finish samples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and 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 level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Door Hardware: Install in accordance with “Section 08 71 00 - Door Hardware.”

B. Install 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. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
   1. Comply with NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING AND CLEANING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Clean hardware and adjacent surfaces upon completion. Do not use abrasives or liquid cleaners that will harm finishes.

C. Touch-Up: After installation, touch-up scratched and damaged surfaces to match shop finish.
   1. Doors shall show no evidence of repair or refinishing.
   2. Replace damaged doors that cannot be repaired to meet Architect's approval.

END OF SECTION

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Access doors and frames for walls and ceilings where necessary for access (whether shown on Drawings or not) to valves, dampers, cleanouts and similar concealed items.

B. Related Sections:
1. Section 06 10 00 - Rough Carpentry.
2. Section 07 84 00 - Firestopping.
3. Section 09 29 00 - Gypsum Board.
4. Section 09 91 00 - Painting.
5. Division 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC): Duct accessories for heating and air-conditioning duct access doors.

1.2 REFERENCE STANDARDS

A. American Society for Testing and Materials (current edition).
1. ASTM A 307 - "Specification for Carbon Steel Externally Threaded Standard Fasteners".
2. ASTM A 366 - "Specification for Steel, Carbon Cold-Rolled Sheet, Commercial Quality".
3. ASTM A 385 - "Recommended Practice for Providing High-Quality Zinc Coatings (Hot-Dip)".
4. ASTM A 386 - "Specification for Zinc-Coating (Hot-Dip) on Assembled Steel Products".
5. ASTM A 570 - "Specification for Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality".
6. ASTM A 611 - "Specification for Steel, Cold-Rolled Sheet, Carbon, Structural".

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:
1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain access doors and frames through 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. Verification: Determine specific locations and verify sizes for required access doors from installers of concealed equipment requiring access.

1.5 COORDINATION

A. Coordination: Furnish inserts and anchorage devices that must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Access Panel Solutions.
2. Acudor Products, Inc.
3. Alfab, Inc.
4. Babcock-Davis.
5. Cendrex Inc.
6. Elmdor/Stoneman Manufacturing Co.; Div. of Acorn Engineering Co.
7. Jensen Industries; Div. of Broan-Nutone, LLC.
8. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
9. Karp Associates, Inc.
10. Larsen's Manufacturing Company.
11. Maxam Metal Products Limited.
12. Metropolitan Door Industries Corp.
13. MIFAB, Inc.
14. Milcor Inc.
15. Nystrom, Inc.
16. Williams Bros. Corporation of America (The).

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics according to the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. NFPA 252 or UL 10B for fire-rated access door assemblies installed vertically.
2. NFPA 288 for fire-rated access door assemblies installed horizontally.

2.3 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Recessed Access Doors (Gypsum Board):
1. Basis-of-Design Product: BABCOCK-DAVIS **"BRW"**
2. Assembly Description: Fabricate door in the form of a pan recessed 5/8 inch for gypsum board infill. Provide frame with gypsum board bead for concealed flange installation.
3. Locations: Wall and ceiling.
4. Door Size: Minimum 24" x 24" or larger as required
5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage.
   a. Finish: Factory prime.
6. Frame Material: Same material, thickness, and finish as door.
7. Hinges: Manufacturer's standard.

8. Hardware: Lock.

B. Recessed Access Doors (Plaster):
   1. Basis-of-Design Product: BABCOCK-DAVIS **"BRP"**.
   2. Assembly Description: Fabricate door in the form of a pan recessed 5/8 inch for plaster infill. Provide frame with plaster bead for concealed flange installation.
   3. Locations: Wall and ceiling.
   4. Door Size: Minimum 24" x 24" or larger as required
   5. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage.
      a. Finish: Factory prime.
   6. Frame Material: Same material, thickness, and finish as door.
   7. Hinges: Manufacturer's standard.
   8. Hardware: Lock.

C. Fire-Rated, Flush Access Doors with Concealed Flanges (Gypsum Board):
   1. Basis-of-Design Product: BABCOCK-DAVIS **"BIW"**.
   2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with gypsum board beads for concealed flange installation.
   3. Locations: Wall and ceiling.
   4. Door Size: Minimum 24" x 24" or larger as required.
   5. Fire-Resistance Rating: Not less than that of adjacent construction.
   6. Temperature-Rise Rating: 450 deg F at the end of 30 minutes or 250 deg F at the end of 30 minutes, as required.
   7. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage.
      a. Finish: Factory prime.
   8. Frame Material: Same material, thickness, and finish as door.
   9. Hinges: Manufacturer's standard.
   10. Hardware: Lock.

D. Fire-Rated, Flush Access Doors with Concealed Flanges (Plaster):
   1. Basis-of-Design Product: BABCOCK-DAVIS **"BIP"**.
   2. Assembly Description: Fabricate door to fit flush to frame, with a core of mineral-fiber insulation enclosed in sheet metal. Provide self-latching door with automatic closer and interior latch release. Provide frame with plaster beads for concealed flange installation.
   3. Locations: Wall and ceiling.
   4. Door Size: Minimum 24" x 24" or larger as required.
   5. Fire-Resistance Rating: Not less than that of adjacent construction.
   6. Temperature-Rise Rating: 450 deg F at the end of 30 minutes or 250 deg F at the end of 30 minutes, as required.
   7. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage.
      a. Finish: Factory prime.
   8. Frame Material: Same material, thickness, and finish as door.
   9. Hinges: Manufacturer's standard.
   10. Hardware: Lock.

E. Exterior Flush Access Doors (If Required):
   1. Basis-of-Design Product: BABCOCK-DAVIS **"BXT"**.

2. Assembly Description: Fabricate door to be weatherproof and fit flush to frame. Provide manufacturer's standard 2-inch-thick fiberglass insulation and extruded door gaskets. Provide manufacturer's standard-width frame for surface mounting, proportional to door size.
3. Locations: Wall.
4. Door Size: Minimum 24” x 24” or larger as required.

5. Door: .080”, 6063-T5 Extruded aluminum.
   a. Finish: Mill finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Gaskets: Santoprene
8. Hinges: Stainless steel continuous piano hinge.
9. Hardware: Lock.

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879, with cold-rolled steel sheet substrate complying with ASTM A 1008, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

D. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.

G. Frame Anchors: Same type as door face.

H. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel per ASTM A 153/A 153M or ASTM F 2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.
   1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
   3. Provide mounting holes in frames for attachment of units to metal or wood framing.
   4. Provide mounting holes in frame for attachment of masonry anchors.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For cylinder locks, furnish two keys per lock and key all locks alike.

2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:
1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Galvanized Metal Repair System:
a. Pretreatment: Z.R.C. Metal Conditioner.
b. Finish: Z.R.C. Cold Galvanizing Compound at 1.5 to 2.0 mils dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install at proper locations and elevations, plumb, level, in alignment and not distorted by fastenings, in accordance with approved shop drawings and manufacturer's published installation instructions.

B. Coordination: Coordinate, including field dimensions, with mechanical work and electrical work as applicable so that items fit and function as intended.

C. Deliver keys, tagged for identification, to Owner’s representative.

3.3 ADJUSTING

A. Remove and replace panels and frames that are warped, bowed, or otherwise damaged.

B. Adjust hardware and panels after installation for proper operation.

3.4 CLEANING

A. Clean surfaces of panels and frames to remove adhered materials from subsequent construction. Remove temporary protection.

B. Touch-Up: Touch up damaged prime coats with approved repair system.

3.5 PROTECTION

A. Protect steel panels and frames from damage and marring during construction with removable self-adhesive plastic.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior and interior storefront framing systems with applied muntins as indicated on drawings.
2. Exterior and interior manual-swing entrance doors with applied muntins as indicated on drawings.
3. Exterior and interior power-assisted swing entrance doors with applied muntins as indicated on drawings.

B. Related Sections:
1. Section 07 92 00 - Joint Sealants: Joint sealants installed as part of aluminum entrance and storefront systems.
2. Section 08 41 26 - All-Glass Entrances and Storefronts.
3. Section 08 44 13 - Glazed Aluminum Curtain Walls.
4. Section 08 71 00 - Door Hardware: For door hardware not supplied by storefront manufacturer and automatic door operators.
5. Section 08 81 00 - Glass Glazing: Glass for storefront.

1.2 DEFINITIONS

A. ADA/ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disability Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities."

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:
1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:
a. Deflection exceeding specified limits.
b. Thermal stresses transferring to building structure.
c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.
d. Noise or vibration created by wind and by thermal and structural movements.
e. Loosening or weakening of fasteners, attachments, and other components.
f. Sealant failure.
g. Failure of operating units.

B. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated:
1. Exterior Walls:
a. Positive Pressure: As indicated on Structural Drawings but not less than 40 psf.

b. Negative Pressure: As indicated on Structural Drawings but not less than 40 psf.

C. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AA Specifications for Aluminum Structures.
1. Without Horizontals: L/175 or 3/4" (19.1mm) maximum.
2. With Horizontals: L/175 or L/240 + 1/4" (6.4mm) for spans greater than 13'-6" (4.1m) but less than 40'-0" (12.2m).

D. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

E. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT² (1.10 m³/h•m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at a differential static pressure of 6.24 PSF (299 Pa).

F. Water Infiltration: No uncontrolled water on interior face of any component when tested in accordance with ASTM E 331 at a static pressure of 10 PSF (479 Pa).

G. Thermal Performance: When tested in accordance with AAMA 1503 and NFRC 100:
1. Condensation Resistance Factor (CRFf): A minimum of 78.
2. Thermal Transmittance U Value: 0.42 BTU/HR/FT²/°F or less.

Note: The CRF for the glazed system as a whole will be affected by the characteristics of the glass specified.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.
1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.
2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Preconstruction Test Reports: For sealant.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

D. Source quality-control reports.

E. Field quality-control reports.

F. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

E. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

F. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical wall area as shown on Drawings or as directed by Architect.
2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

H. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver aluminum entrance and storefront components in the manufacturer's original protective packaging.

B. Storage: Store aluminum components in a clean dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.
   1. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.9 PROJECT CONDITIONS

A. Field Measurements: Check openings by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the work.
   1. Where necessary, proceed with fabrication without field measurements, and coordinate fabrication tolerances to ensure proper fit.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration caused by thermal movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Adhesive or cohesive sealant failures.
      e. Water leakage through fixed glazing and framing areas.
      f. Failure of operating components.
   2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: The following manufacturers are acceptable only after strict compliance with the requirements of this Section:
   1. YKK AP AMERICA, INC
   2. KAWNEER COMPANY, INC.
   3. EFCO
   4. VISTAWALL INTERNATIONAL
   5. Other Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

2.2 ALUMINUM-FRAMED STOREFRONTS

A. Exterior Storefront Framing System: Thermally broken, exterior glazed; framing members attached with intermediate horizontals attached by screw spline and/or shear block joinery with concealed fasteners.
   1. Exterior Framing: 2” x 4½” for 1” glazing, thermally broken, with applied muntins, outside glazed.

B. Interior Storefront Framing System: Interior framing members attached with intermediate horizontals attached by screw spline and/or shear block joinery with concealed fasteners.
   1. Interior Framing: 1 ¾” x 4½” for ¼” glazing with applied muntins, center set, outside or inside glazed.

2.3 ALUMINUM ENTRANCES

A. Exterior Swing Door: Medium stile" with 1" thick glass vision lites with applied muntins as specified in "Section 08 81 00 - Glass Glazing."
   1. Description: 3-1/2" Door Stiles, thermally broken, 1" insulating glazing.

B. Interior Swing Door: Medium stile" with ¼: thick glass vision lites with applied muntins as specified in "Section 08 81 00 - Glass Glazing."
   1. Description: 3-1/2" Door Stiles, non-thermally broken, 1/4" glazing.

2.4 MATERIALS

A. Aluminum Members: Alloy and temper recommended by the manufacturer for strength, corrosion resistance, and application of required finish; comply with ASTM B 221 for aluminum extrusions, ASTM B 209 for aluminum sheet or plate, and ASTM B 211 for aluminum bars, rods and wire.

B. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.

2.5 DOOR HARDWARE

A. Push-Pull: Selected by Architect from manufacturer's available products.

B. Hinges: Provided under "Section 08 71 00 - Door Hardware."

C. Overhead Closer/Stop: Provided under "Section 08 71 00 - Door Hardware."

D. Automatic Door Operators: Provided under "Section 08 71 00 - Door Hardware."

E. Cylinder Lock: Provided under "Section 08 71 00 - Door Hardware."

F. Exit/Panic Devices: Provided under "Section 08 71 00 - Door Hardware."

G. Threshold: Manufacturer's standard.

H. Weatherstripping: Manufacturer's standard.

2.6 ACCESSORY MATERIALS

A. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.

B. Sealant: Non-skinning type, AAMA 803.3.

C. Perimeter Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in "Section 07 92 00 - Joint Sealants."

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 GLAZING SYSTEMS

A. Glazing: As specified in "Section 08 81 00 - Glass Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Setting Blocks, Edge Blocks, and Spacers: In accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; glazing gaskets in accordance with ASTM C 864

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

2.8 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.
   1. Hardware: Drill and cut to template for hardware. Reinforce frames and door stiles to receive hardware in accordance with manufacturer's recommendations.
   2. Welding: Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

B. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows to storefront framing.
   1. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements of "Section 08 81 00 - Glass Glazing: and with AAMA/WDMA/CSA 101/I.S.2/A440-08 (NAFS).

C. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.9 FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   1. Color: Custom color selected by Architect.

PART 3 - XECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
   1. Verify location of preset anchors, perimeter fasteners, and block-outs are in accordance with shop drawings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
   1. Aluminum Surface Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Shim and brace aluminum system before anchoring to structure.

D. Provide sill flashing at exterior storefront systems. Extend extruded flashing continuous with slice joints; set in continuous beads of sealant. Comply with requirements of “Section 07 92 00 - Joint Sealants.”

E. Verify storefront system allows water entering system to be collected in gutters and wept to exterior. Verify metal joints are sealed in accordance with the manufacturer's instructions.

F. Seal metal to metal storefront system joints using sealant recommended by system manufacturer.

G. Install entrances plumb and true in alignment with established lines and grades without warp or rack. Lubricate operating hardware and other moving parts according to hardware manufacturers' written instructions.
   1. Install surface-mounted hardware according to manufacturer's written instructions using concealed fasteners to greatest extent possible.

H. Install glazing to comply with requirements of “Section 08 81 00 - Glass Glazing, unless otherwise indicated.

I. Install perimeter sealant to comply with “Section 07 92 00 - Joint Sealants”, unless otherwise indicated.

J. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances:
   1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet; 1/4 inch over total length.
   2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
   3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
   1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspecting of installed storefront shall take place as follows:
   1. Testing Methodology: Testing of storefront for air infiltration and water resistance shall be performed according to AAMA 502.
      a. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
   2. Water-Resistance Testing:
      a. a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA 101/I.S.2/A440 performance grade indicated.
      b. Allowable Water Infiltration: No water penetration.
   3. Testing Extent: Three (3) areas as selected by Architect and a qualified independent testing and inspecting agency, in addition to the mockup window. Windows shall be tested immediately after installation.
      a. When storefront installation is approximately 50 percent complete, test two additional areas at locations selected by Owner.
   4. Test Reports Prepared according to AAMA 502.

C. Repair noncompliant storefront and retest as specified above.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 ADJUSTING AND CLEANING

A. Adjusting: Adjust doors, operating sashes, and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

B. Cleaning: Clean installed products in accordance with manufacturer’s instructions prior to Owner acceptance.
   1. Remove excess sealant and glazing compounds, and dirt from surfaces.

C. Legally dispose of debris.

3.6 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer. Ensure entrance and storefront systems are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 08 44 13

GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Aluminum curtain wall framing system to receive inset aluminum windows and applied window panning and trim as indicated on drawings.

B. Related Sections:
1. Section 07 62 00 - Sheet Metal Flashing and Trim.
2. Section 07 84 00 - Firestopping: Perimeter fire-containment systems (safing insulation) field installed with glazed aluminum curtain-wall systems.
3. Section 07 92 00 - Joint Sealants: Joint sealants installed with aluminum curtain wall systems.
4. Section 08 41 13 - Aluminum Entrances and Storefronts.
5. Section 08 51 13 - Aluminum Windows: Aluminum windows installed within curtain wall system and applied window panning and trim for curtain wall.
6. Section 08 81 00 - Glass Glazing.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of manufacturer's standard glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Glazed aluminum curtain walls shall withstand movements of supporting structure indicated on Drawings including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:
a. Thermal stresses transferring to building structure.
b. Glass breakage.
c. Noise or vibration created by wind and thermal and structural movements.
d. Loosening or weakening of fasteners, attachments, and other components.

B. Wind Loads: Completed curtain wall system shall withstand wind pressure loads normal to wall plane indicated:
1. Exterior Walls:
a. Positive Pressure: As indicated on Structural Drawings but not less than 40 psf.
b. Negative Pressure: As indicated on Structural Drawings but not less than 40 psf.

C. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AA Specifications for Aluminum Structures.
1. For spans up to 13’-6” (4.1m): L/175 maximum.
2. For spans greater than 13’-6” (4.1m) but less than 40’-0” (12.2m): L/175 or L/240 + 1/4” (6.4mm).

D. Thermal Movement: Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

E. Air Infiltration: Completed curtain wall systems shall have 0.06 CFM/FT² (1.10 m³/h•m²) maximum allowable infiltration when tested in accordance with ASTM E 283 at a differential static pressure of 6.24 PSF (299 Pa).

F. Water Infiltration:
1. No uncontrolled water on interior face of any component when tested in accordance with ASTM E 331 at a static pressure of 15 PSF (718 Pa).
2. No uncontrolled water on indoor face of any component when tested in accordance with AAMA 501.1 at a dynamic pressure of 15 PSF (718 Pa).

G. Thermal Performance: When tested in accordance with AAMA 507, AAMA 1503.1 and NFRC 100:
1. Condensation Resistance Factor (CRF_f): A minimum of 65 CRF_f.
2. Thermal Transmittance U Value: 0.46 BTU/HR/FT²/°F or less.

Note: Thermal performance for the glazed system as a whole will be affected by the characteristics of the glass specified and percentage of vision area

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for curtain wall system.

B. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Seismic Qualification Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

C. Preconstruction Test Reports: For sealant.

D. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for glazed aluminum curtain walls, indicating compliance with performance requirements.

F. Field quality-control reports.

G. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

D. Source Limitations for Curtain Wall Systems: Obtain from single source from single manufacturer.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical wall area as shown on Drawings or directed by Architect.
2. Field testing shall be performed on mockups according to requirements in "Field Quality Control" Article.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver aluminum curtain wall components in the manufacturer's original protective packaging.

B. Storage: Store aluminum components in a clean dry location away from uncured masonry or concrete. Cover components with waterproof paper, tarpaulin or polyethylene sheeting in a manner to permit circulation of air.

1. Stack framing components in a manner that will prevent bending and avoid significant or permanent damage.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of curtain wall systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration caused by thermal movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Adhesive or cohesive sealant failures.
      e. Water leakage through fixed glazing and framing areas.
      f. Failure of operating components.
   2. Warranty Period: Five (5) years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: The following manufacturers are acceptable only after strict compliance with the requirements of this Section:
   1. YKK AP AMERICA, INC
   2. KAWNEER COMPANY, INC.
   3. EFCO
   4. OLDCASTLE BUILDING ENVELOPE
   5. Other Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

2.2 CURTAIN WALL FRAMING SYSTEM

A. Curtain Wall Framing System Description: Framing shall be thermally improved with a nominal face dimension of 2-1/2 inches and depth as indicated on shop drawings. Framing shall provide a flush glazed appearance on all sides with no protruding glass stops.
   1. Components: Manufacturer’s standard extruded aluminum mullions and indicated shapes.

2. Thermal Barrier: The thermal barrier shall consist of isolator clips between the face cover and mullion that minimize all metal to metal contact between the exterior and interior. Systems employing non structural type thermal barriers are not acceptable.

2.3 MATERIALS

A. Aluminum Members:
   1. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 and 6063-T6 Aluminum Alloys.
   2. Aluminum Sheet:
      a. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050" (1.27 mm) minimum thickness.
      b. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H14 Aluminum Alloy, 0.080" (1.95 mm) minimum thickness.

B. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, zinc plated steel, or other material warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.
   1. Reinforcement: Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

C. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements; where use of aluminum is not feasible provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 123.

2.4 ACCESSORY MATERIALS

A. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.

B. Sealant: Non-skinning type, AAMA 803.3.

C. Perimeter Joint Sealants: For installation at perimeter of curtain wall systems, as specified in "Section 07 92 00 - Joint Sealants."

D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.5 GLAZING SYSTEMS

A. Glazing: As specified in "Section 08 81 00 - Glass Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Setting Blocks, Edge Blocks, and Spacers: In accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; glazing gaskets in accordance with ASTM C 864

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

2.6 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

B. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMILNUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF or FEVE resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   1. Color: Custom color selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Verify conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.
   1. Verify location of preset anchors, perimeter fasteners, and block-outs are in accordance with shop drawings.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.2 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
   1. Aluminum Surface Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing curtain wall systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
   1. Coordinate installation of aluminum windows to be inset within curtain wall framing.

B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Shim and brace aluminum system before anchoring to structure.

D. Provide sill flashing at curtain wall systems. Extend extruded flashing continuous with slice joints; set in continuous beads of sealant. Comply with requirements of “Section 07 92 00 - Joint Sealants.”

E. Verify curtain wall system allows water entering system to be collected in gutters and wept to exterior. Verify metal joints are sealed in accordance with the manufacturer's instructions.

F. Seal metal to metal curtain wall system joints using sealant recommended by system manufacturer.

G. Install glazing to comply with requirements of “Section 08 81 00 - Glass Glazing, unless otherwise indicated.

H. Install perimeter sealant to comply with “Section 07 92 00 - Joint Sealants”, unless otherwise indicated.

I. Erection Tolerances: Install curtain wall systems to comply with the following maximum tolerances:
   1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 12 feet; 1/4 inch over total length.
   2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
   3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
   1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
   1. Testing Methodology: Testing of curtain walls/windows for air infiltration and water resistance shall be performed according to AAMA 502.
      a. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
   2. Water-Resistance Testing:
      a. a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA 101/I.S.2/A440 performance grade indicated.
      b. Allowable Water Infiltration: No water penetration.
   3. Testing Extent: Five (5) windows as selected by Architect and a qualified independent testing and inspecting agency, in addition to the mockup window. Windows shall be tested immediately after installation.
      a. When window installation is approximately 50 percent complete, test two additional windows at locations selected by Owner.
   4. Test Reports Prepared according to AAMA 502.

C. Repair noncompliant curtain wall/aluminum windows and retest as specified above.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING

A. Cleaning: Clean installed products in accordance with manufacturer’s instructions prior to Owner acceptance.
   1. Remove excess sealant and glazing compounds, and dirt from surfaces.
   2. Legally dispose of debris.

3.6 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer. Ensure curtain wall systems are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Factory-assembled, factory-glazed, fixed aluminum windows complete with historic panning at head, jamb and sills.

B. Related Sections:
1. Section 04 20 00 - Unit Masonry.
2. Section 04 43 13 - Limestone.
3. Section 07 27 26 - Fluid-Applied Membrane Air Barriers.
4. Section 07 92 00 - Joint Sealants: Perimeter sealant.
5. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.
6. Section 08 44 13 - Glazed Aluminum Curtain Walls: Aluminum windows set within curtain wall framing.
7. Section 08 81 00 - Glass Glazing.

1.2 DEFINITIONS

A. Performance class designations according to AAMA/WDMA 101/I.S.2/A440:
1. AW: Architectural.
2. CW: Commercial Window.
3. LC: Light Commercial.
4. R: Residential.

B. Performance grade number according to AAMA/WDMA 101/I.S.2/A440:
1. Design pressure number in pounds force per square foot used to determine the structural test pressure and water test pressure.

C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.

D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size required by AAMA/WDMA 101/I.S.2/A440.
1. Performance requirements shall apply to all manufacturer's window components, including any panning, receiver, or subsill.
2. Performance requirements shall apply to window components installed in glazed curtain wall frames as a complete assembly.
3. Window Certification: AMMA certified with label attached to each window.

B. Structural Performance: Provide aluminum windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/A440, Uniform Load Structural Test:
   1. Design Wind Loads: 40 psf, minimum.
   2. Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/A440, Uniform Load Deflection Test or structural computations.

C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, glazing and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for aluminum windows.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances, and installation details, including applicable wall openings and required joint sealant clearances.
   1. Mullion details, including reinforcement and stiffeners.
      a. Details must provide 1-1/2 inch solid return flanges on panning for sealant installation.
      b. Minimum sealant around perimeter of frames shall be 3/8-inch wide.
   2. Joinery details.
   3. Expansion provisions.
   4. Flashing and drainage details.
   5. Weather-stripping details.
   6. Thermal-break details.
   7. Glazing details.
   8. For installed products indicated to comply with design loads, include structural analysis data prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of aluminum windows and used to determine the following:
      a. Structural test pressures and design pressures from wind loads indicated.
      b. Deflection limitations of glass framing systems.

C. Installation Instructions: Provide manufacturer's installation instructions for field installed components that are dependent on proper installation and sealing of components to comply with specified performance criteria.

D. Sample Window: Furnish one typical window unit, minimum 24 by 36 inches.
   1. The sample must be a true and accurate representation of the window, including panning, trim, and muntins, as detailed on the drawings

E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of aluminum window, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
1. Installer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of data for aluminum windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project

A. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/A440, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

B. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

C. Certification: Test reports shall be accompanied by the window manufacturer’s letter of certification, stating the tested window meets or exceeds the referenced criteria for the appropriate AAMA/NWWDA 101/I.S.2/NAFS-02 window type.

D. Source Limitations: All windows shall be by a single manufacturer.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Install sample window in masonry wall mockup specified in “Section 04 20 00 - Unit Masonry.”
2. Perform tests specified in "Field Quality Control" Article. Modify mockup construction and perform additional tests as required to achieve specified minimum acceptable results.
3. Approved mockup shall represent minimum quality required for the Work.
4. Approved mockup may remain in place within the Work.

1.8 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review and discuss the finishing of aluminum windows that is required to be coordinated with the finishing of other aluminum work for color and finish matching.
   3. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchorage, flashing, sealing perimeters, and protecting finishes.
   4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
   5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.9 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site undamaged in manufacturer's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name.

B. Storage: Store materials in an upright position, off ground, under cover, and protected from weather, direct sunlight, and construction activities.

C. Handling: Protect materials and finish during handling and installation to prevent damage.

1.10 PROJECT CONDITIONS

A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.11 WARRANTIES

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Structural failures including excessive deflection, water leakage, condensation, and air infiltration.
      c. Faulty operation of movable sash and hardware.
      d. Deterioration of materials and finishes beyond normal weathering.
      e. Failure of insulating glass.
   2. Warranty Period:
      a. Window: Ten (10) years from date of Substantial Completion.
      b. Glazing: Ten (10) years from date of Substantial Completion.
      c. Aluminum Finish: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Graham Architectural Products Corp. – S1400FX Offset
   2. Wassau – 4250i Invent Retro Offset
   3. Winco Window Company – 1450S
   4. Other Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

2.2 ALUMINUM WINDOWS

A. Window Types: Simulated hung windows and fixed windows. Frame design and trim/panning must be capable of being installed "post-set" meaning that window frame/receptor system can be installed and waterproofed to the 'dry line' of the air barrier & sheathing with trim/panning profiles capable of being installed after frame is watertight to the building envelope.

B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA 101/I.S.2/A440 unless more stringent performance requirements are indicated.
   1. Minimum Performance Class: AW.
   2. Minimum Performance Grade: 40.

C. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 50, minimum.

D. Thermal Transmittance: Provide aluminum windows with a whole-window, U-factor maximum indicated at 15-mph exterior wind velocity and winter condition temperatures when tested according to AAMA 1503.
   1. U-Factor: 0.43 Btu/sq. ft. x h x deg F or less.

E. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/WDMA 101/I.S.2/A440, Air Infiltration Test.
   1. Maximum Rate: 0.15 cfm/sq. ft. of area at an inward test pressure of 6.24 lbf/sq. ft.

F. Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/A440, Water Resistance Test.
   1. Test Pressure: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft.

2.3 GLAZING

A. Glass and Glazing Materials: Refer to "Section 08 81 00 - Glass Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
   1. Windows are to be factory glazed.

2.4 FABRICATION AND ACCESSORIES

A. General: Provide manufacturer's standard fabrication and accessories which comply with specifications. Include complete system for assembly of components and anchorage of window units and provide complete pre-glazing at the factory.

B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
   1. Design calculations and steel reinforcing within the window system is to be provided by the window manufacturer.

G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch- thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.

H. Simulated Muntins: Double muntin system to simulate a true muntin appearance. Align muntins within the window system and from window to window within an industry acceptable tolerance.
   1. Exterior Grids: 0.312-inch hollow extruded aluminum, trapezoidal shaped, finish to match the storefront system.
      a. Attach grids without exposed fasteners.
      b. Mechanically fasten to beveled exterior integral glazing leg with concealed stainless steel drive pins at each contact point. Simulated drop-in muntin grids between the glazing and the glazing stop are not acceptable.
      c. Machine and mechanically fasten intersections of the muntin grids.
      d. Surface applied muntins with adhesive to glass are not acceptable.
   2. Interior Grids: As detailed.

I. Horizontal Stack Section: Tubular extruded shape with exterior 1-3/8 by 3/4-inch mullion cover.

2.5 CASING COVER SYSTEM: (Panning, Trims, Receptors, Mullions, Sills etc.)

A. Exterior Casing Covers (Panning, Receptors, Subsills, Sills): Provide extruded prime alloy aluminum 6063-T5 no less than nominal 0.078 inch wall thickness. Casing covers of less than 2 inches in depth from the window frame may be of 0.062 inch wall thickness.
   1. Provide aluminum sections of one piece designed to lock around the entire window frame for a weathertight connection.
   2. Secure the casing cover section at the corners with stainless steel screws in integral screw ports with the joints back sealed using a compatible sealant.
   3. Exterior preset panning at head, jamb, and sills: Wrap around frame casings are not acceptable.
   4. Exposed screws, fasteners or pop rivets are not acceptable on the exterior of the casing cover system.

B. Glazing Stops: Provide extruded aluminum glazing stops coordinated with “Section 08 81 00 - Glass Glazing” and glazing system indicated.
   1. Manufacturer's standard sealant process and glass held in place by an extruded aluminum glazing bead. Wrap around glazing is not acceptable.

C. Subsills: Nonthermal, extruded-aluminum subsills in configurations indicated on Drawings.
   1. Unless permitted otherwise, configure sill connectors to not penetrate the horizontal leg of the sill pan.

2.6 ALUMINUM FINISHES

A. Exterior Finish System: Organic fluoropolymer, 70% PVDF, 2 coat process.
   1. Performance Requirements: Exterior aluminum finishes shall meet or exceed the performance requirements of AAMA 2605.
   2. Color: Custom color selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Place interior seal around window perimeter to maintain continuity of building thermal and air barrier using insulating-foam sealant.

E. Set sill members and other members in bed of compound as shown, or with joint fillers or gaskets as shown, to provide weathertight construction. Seal units following installation and as required to provide weathertight system.

F. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

G. All windows are to be installed to allow for installation of the primary waterproofing seal to be installed between the window frame and the air barrier/exterior sheathing. All installations must allow for water testing to be administered on the window prior to masonry veneer being installed to ensure a watertight and draining assembly. Once a mock-up and/or suitable number of windows have passed field water tests, the installation of masonry will be able to be sequenced for the en masse installation of windows.

3.3 FIELD QUALTIY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
   1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
   1. Testing Methodology: Testing of windows for air infiltration and water resistance shall be performed according to AAMA 502.
      a. Allowable Air-Leakage Rate: 1.5 times the applicable AAMA/WDMA 101/I.S.2/A440 rate for product type and performance class rounded down to one decimal place.
   2. Water-Resistance Testing:
      a. a. Test Pressure: Two-thirds times test pressure required to determine compliance with AAMA/WDMA 101/I.S.2/A440 performance grade indicated.
      b. Allowable Water Infiltration: No water penetration.
   3. Testing Extent: Five windows as selected by Architect and a qualified independent testing and inspecting agency, in addition to the mockup window. Windows shall be tested immediately after installation.
      a. When window installation is approximately 50 percent complete, test two additional windows at locations selected by Owner.
   4. Test Reports Prepared according to AAMA 502.

C. Repair noncompliant aluminum windows and retest as specified above.

D. Additional testing and inspecting, at Contractor's expense, will be performed for failed water tests.
      a. Test three additional windows for each failed test.

3.4 CLEANING

A. Remove manufacturer’s labels and visible markings.

B. Clean exposed surfaces immediately after installing windows. Do not use harsh cleaning materials or methods that would damage finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

3.5 PROTECTION

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry

surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations

END OF SECTION

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. 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 “All-Glass Entrances”.

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. 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. 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.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. 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.

H. 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

I. 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 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.

2.3 FLOOR CLOSERS AND PIVOTS

A. Pivots: ANSI/BHMA A156.4, Grade 1; space intermediate pivots equally not less than 25 inches on center apart or not more than 35 inches on center for doors over 121 inches high. Pivot hinges to have oil

impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot with the bottom pivot designed to carry the full weight of the door. Pivots to be UL listed for windstorm where applicable.

1. Manufacturers:

    a. Norton Rixson (RF).

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.

B. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish 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. 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) - EL-CEPT Series.
    b. Securitron (SU) - EL-CEPT Series.

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. Hager Companies (HA) - Quick Connect.
    b. McKinney (MK) - QC-C 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. Burns Manufacturing (BU).
    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. Burns Manufacturing (BU).
    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.

1. Manufacturers:

    a. Sargent Manufacturing (SA).
    b. Match Existing, Field Verify.

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: Match Facility Restricted Keyway.

C. 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. Existing System: Field verify and key cylinders to match Owner's existing system.

D. 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).

E. Construction Keying: Provide construction master keyed cylinders.

F. 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 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical locksets shall have the following functions and features:

   a. Universal Molex plug-in connectors that have standardized color-coded wiring and are available 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 deadbolt monitoring.
   d. Optional high security monitoring with internal end-of-line monitoring alongside deadbolt privacy and integrated door position monitoring.
   e. Two-year limited warranty on electrified functions.

2. Manufacturers:

a. Sargent Manufacturing (SA) - 8200 Series.

2.8 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.

2.9 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. Manufacturers:

    a. Sargent Manufacturing (SA) - 80 Series.

2.10 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 (Large Body Cast Iron): 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 body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Large body cast iron surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:

    a. LCN Closers (LC) - 4040XP Series.
    b. Sargent Manufacturing (SA) - 281 Series.

C. Door Closers, Overhead Concealed (Narrow Profile): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed door closers designed for narrow profile frames and doors. Closers to have fully concealed body in the frame head for offset hung applications, with separate and independent valves for closing speed and backcheck adjustments and a decorative cover plate.

1. Manufacturers:

a. Norton Rixson (RF) - 91DCP Series.

2.11 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. Metal Door Edging: Door protection edging fabricated from a minimum .050-inch thick metal sheet, formed into an angle or "U" cap shapes, surface or mortised mounted onto edge of door. Provide appropriate leg overlap to account for protection plates as required. Height to be as specified in the Hardware Sets.
7. Manufacturers:

a. Rockwood (RO).
b. Trimco (TC).

2.12 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. Burns Manufacturing (BU).
b. Rockwood (RO).
c. Trimco (TC).

2.13 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. Zero (ZE).

2.14 ELECTRONIC ACCESSORIES

A. 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.

2.15 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.

2.16 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. 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.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. 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. RF - Rixson
3. SU - Securitron
4. RO - Rockwood
5. SA - SARGENT
6. OT - Other
7. PE - Pemko

Hardware Sets

Set: 1.0

Doors: 2002

Description: EXHIBITION PR - ALUM - EAC

2	Pivot Set	195	626	RF	
2	Intermediate Pivot	ML19	626	RF	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Removable Mullion	L980S	PC	SA	
1	Exit Device (storeroom)	16 43 55 56 8804 ETL	US32D	SA	
1	Rim Exit Device, Dummy	16 43 8810 ETL	US32D	SA	
3	Mortise Cylinder	as required to match campus std	US15	SA	
2	Concealed Closer	91N 90N [special template]	626	RF	
2	Wall Stop	409 / 446 [as required]	US32D	RO	
1	Astragal	S772BL (mtg on mullion)		PE	
1	Gasketing	by door / frame mfg			
1	Card reader	"Alabama" Reader by owner		OT	
1	Power Supply	By Owner		OT	⚡
1	ElectroLynx Harness	QC-C1500 [PS to hinge]		MK	⚡
1	ElectroLynx Harness	QC-CXXP [Lock / exit to hinge]		MK	⚡

Set: 2.0

Doors: 2001, C102.2

Description: EXT ENTRY - ALUM - EAC - A/O

1	Pivot Set	195	626	RF	
1	Intermediate Pivot	ML19	626	RF	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Exit Device (storeroom)	16 43 55 56 8804 ETL	US32D	SA	
1	Mortise Cylinder	as required to match campus std	US15	SA	
1	Auto operator	By others - see section 08XXXX		OT	
1	Gasketing	by door / frame mfg			
1	Card reader	"Alabama" Reader by owner		OT	
1	Wall actuator	By others - see section 08XXXX		OT	
1	ElectroLynx Harness	QC-C1500 [PS to hinge]		MK	⚡
1	ElectroLynx Harness	QC-CXXP [Lock / exit to hinge]		MK	⚡

Set: 3.0

Doors: 1024.2, C101.2

Description: EXT EGRESS - ALUM

1	Pivot Set	195	626	RF
1	Intermediate Pivot	ML19	626	RF
1	Exit Device (storeroom)	16 43 8804 ETL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Concealed Closer	91N 90N [special template]	626	RF
1	Door Stop	480	US26D	RO
1	Gasketing	by door / frame mfg		

Set: 4.0

Doors: 1017.1
Description: EXT MEP - PR

6	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK
2	Surface Bolt	580-8	US32D	RO
1	Storeroom Lock	8204 LNL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
2	Door Closer	281 CPS	EN	SA
2	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Astragal	S772D (mtg on ast)		PE
1	Astragal	357SP		PE
1	Gasketing	S773BL		PE
1	Rain Guard	346C x LAR		PE
2	Sweep	315CN		PE
1	Threshold	1715AK Pemkote		PE

Set: 5.0

Doors: 1010.2
Description: EXT - WORK - EAC

2	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK
1	Electric Hinge, Hvy Wt	T4A3386-QCXX 4-1/2" x 4-1/2"	US32D	MK
1	Exit Device (storeroom)	16 43 55 56 8804 ETL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Door Closer	281 CPS	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Gasketing	S773BL		PE
1	Rain Guard	346C x LAR		PE
1	Sweep	315CN		PE

1	Threshold	271A Pemkote MSES25SS	PE	
1	Card reader	"Alabama" Reader by owner	OT	
1	Power Supply	By Owner	OT	⚡
1	ElectroLynx Harness	QC-C1500 [PS to hinge]	MK	⚡
1	ElectroLynx Harness	QC-CXXP [Lock / exit to hinge]	MK	⚡

Notes: Door normally closed and secured.
Authorized credential retracts the latchbolt to allow free entry, door relocks upon closing. REX (request to exit) switch in device rail allow for free exit at all times
Entry by key override at all times
Door is fail secure

Set: 6.0

Doors: C201.1
Description: EXT - STAIR [EO]

3	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK	
1	Rim Exit Device, Exit Only	16 43 8810 EO	US32D	SA	
1	Door Closer	281 CPS	EN	SA	
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO	
1	Gasketing	S773BL		PE	
1	Rain Guard	346C x LAR		PE	
1	Sweep	315CN		PE	
1	Threshold	271A Pemkote MSES25SS		PE	

Notes:

Set: 7.0

Doors: 1013
Description: EXT MEP - EAC

2	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QCXX 4-1/2" x 4-1/2"	US32D	MK	⚡
1	Electrified Mortise Lock	NAC-82274-24v LNL	US26D	SA	⚡
1	Mortise Cylinder	as required to match campus std	US15	SA	
1	Door Closer	281 CPS	EN	SA	
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO	

1	Gasketing	S773BL	PE	
1	Rain Guard	346C x LAR	PE	
1	Sweep	315CN	PE	
1	Threshold	1715AK Pemkote	PE	
1	Card reader	"Alabama" Reader by owner	OT	
1	Power Supply	By Owner	OT	⚡
1	ElectroLynx Harness	QC-C1500 [PS to hinge]	MK	⚡
1	ElectroLynx Harness	QC-CXXP [Lock / exit to hinge]	MK	⚡

Set: 7.1

Doors: 1027
Description: EXT MEP

3	Hinge (heavy weight)	T4A3386 x NRP 4-1/2" x 4-1/2"	US32D	MK
1	Storeroom Lock	8204 LNL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Door Closer	281 CPS	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Gasketing	S773BL		PE
1	Rain Guard	346C x LAR		PE
1	Sweep	315CN		PE
1	Threshold	1715AK Pemkote		PE

Set: 8.0

Doors: C101.1, C102.1, C201.2, C202, C301, C302
Description: STAIR - RATED

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Exit Device (passage)	12 43 8815 ETL	US32D	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE

Set: 9.0

Doors: 3012
Description: STOR - RATED

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK

1	Storeroom Lock	8204 LNL	US32D	SA	
1	Mortise Cylinder	as required to match campus std	US15	SA	
1	Door Closer	281 Reg/PA	EN	SA	
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO	
1	Wall Stop	409 / 446 [as required]	US32D	RO	
1	Gasketing	S773BL		PE	

Set: 10.0

Doors: 1009, 1026, 2015, 2019, 3009, 3013
Description: ENTRY - EAC

2	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	
1	Hinge, Full Mortise	TA2714 QCXX 4-1/2" x 4-1/2"	US26D	MK	⚡
1	Electrified Mortise Lock	NAC-82274-24v LNL	US26D	SA	⚡
1	Mortise Cylinder	as required to match campus std	US15	SA	
1	Door Closer	281 Reg/PA	EN	SA	
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO	
1	Wall Stop	409 / 446 [as required]	US32D	RO	
3	Silencer	608		RO	
1	Card reader	"Alabama" Reader by owner		OT	
1	Power Supply	By Owner		OT	⚡
1	ElectroLynx Harness	QC-C1500 [PS to hinge]		MK	⚡
1	ElectroLynx Harness	QC-CXXP [Lock / exit to hinge]		MK	⚡

Set: 11.0

Doors: 1014, 2014, 3011
Description: ELEC

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK	
1	Exit Device (storeroom)	16 43 8804 ETL	US32D	SA	
1	Mortise Cylinder	as required to match campus std	US15	SA	
1	Door Closer	281 Reg/PA	EN	SA	
1	Wall Stop	409 / 446 [as required]	US32D	RO	
3	Silencer	608		RO	

Set: 12.0

Doors: C205, C206
Description: CORR

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Exit Device (passage)	16 43 8815 ETL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
3	Silencer	608		RO

Set: 13.0

Doors: 1006, 1017.2, 1018, 1025, 2016, 3010
Description: MEP / DATA

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	8204 LNL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
3	Silencer	608		RO

Set: 14.0

Doors: 1007, 2011, 3005
Description: JAN

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	8204 LNL	US32D	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 4" X 1" LDW 4BE CSK	US32D	RO
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE

Set: 15.0

Doors: 1001, 1004, 1010.1, 1015, 1019, 2020, 2025
Description: WORK / READING

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Lock	8237 LNL	US26D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Door Closer	281 Reg/PA	EN	SA

1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE

Set: 16.0

Doors: 1002, 2012, 2013, 3006, 3007
Description: TOILET

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Privacy Set	LB 49 8265 LNL	US26D	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 4" X 1" LDW 4BE CSK	US32D	RO
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE
1	Coat Hook	RM828	US32D	RO

Set: 17.0

Doors: 3025
Description: BREAK

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Passage Set	8215 LNL	US26D	SA
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
3	Silencer	608		RO

Set: 18.0

Doors: 1005, 1008
Description: RESTROOM

3	Hinge (heavy weight)	T4A3786 4-1/2" x 4-1/2"	US26D	MK
1	Door Pull	BF162	US32D	RO
1	Push Plate	70C	US32D	RO
1	Door Closer	281 Reg/PA	EN	SA
1	Kick Plate	K1050 4" X 1" LDW 4BE CSK	US32D	RO
1	Kick Plate	K1050 10" X 2" LDW 4BE CSK	US32D	RO
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE

Set: 19.0

Doors: 1003, 1016, 1020, 1024.1, 1024.3, 2007
Description: STOR

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Storeroom Lock	8204 LNL	US32D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Wall Stop	409 / 446 [as required]	US32D	RO
3	Silencer	608		RO

Set: 20.0

Doors: 1021, 1022, 1023, 2003, 2006, 2009, 2017, 2022, 2023, 2024, 2027, 2029, 2030, 2031, 3001, 3002, 3003, 3004, 3008, 3015, 3016, 3017, 3020, 3021, 3022, 3023, 3024, 3026
Description: OFFICE

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Office Lock	8205 LNL	US26D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Wall Stop	409 / 446 [as required]	US32D	RO
1	Gasketing	S773BL		PE

Set: 21.0

Doors: 1011, 1012, 2010
Description: WORK

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Lock	8237 LNL	US26D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Wall Stop	409 / 446 [as required]	US32D	RO
3	Silencer	608		RO

Set: 22.0

Doors: 2004, 2005, 2008
Description: CLASS

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1	Classroom Lock	8237 LNL	US26D	SA
1	Mortise Cylinder	as required to match campus std	US15	SA
1	Wall Stop	409 / 446 [as required]	US32D	RO

1 Gasketing	S773BL		PE

Set: 23.0

Doors: 2026, 3018
Description: CLOSET

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Passage Set	8215 LNL	US26D	SA
1 Wall Stop	409 / 446 [as required]	US32D	RO
3 Silencer	608		RO

Set: 24.0

Doors: 2028, 3019
Description: CONF

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Passage Set	8215 LNL	US26D	SA
1 Wall Stop	409 / 446 [as required]	US32D	RO
1 Gasketing	S773BL		PE

Set: 25.0

Doors: -, 2021, 3014
Description: CASED

1 Cased open	No hardware required

Set: 26.0

Doors: -
Description: GATE

1 HBO	All hardware By door mfg

END OF SECTION 087100

SECTION 08 81 00

GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
      a. Doors.
      b. Glazed entrances.
      c. Storefront framing.
      d. Glazed Curtain Walls.
   2. Refer to “Glass Type Schedule” at the end of this Section.

B. Related Sections:
   1. Section 07 92 00 - Joint Sealants.
   2. Section 08 11 13 - Hollow Metal Doors and Frames: Exterior and interior doors and framing to receive glass.
   3. Section 08 14 16 - Flush Wood Doors: Flush wood doors to receive glass.
   4. Section 08 41 13 - Aluminum Entrances and Storefronts: Aluminum storefront and entrances to receive glass.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.3 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:
   1. Design Wind Pressures: As indicated on Drawings.
   2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
   3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
   2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square. For exterior 1” clear low-E provide a minimum of 3 samples of the 1” insulating unit for review and approval prior to proceeding with fabrication.

C. Glazing Accessory Samples: For gaskets and sealants, in 12-inch (300-mm) lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers, manufacturers of insulating-glass units with sputter-coated, low-e coatings, glass testing agency and sealant testing agency]

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass, coated glass, insulating glass, glazing sealants and glazing gaskets.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain tinted float glass, coated float glass, laminated glass and insulating glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
   3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
   4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or the manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.

J. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

K. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Install glazing in mockups specified in other Sections to match glazing systems required for Project, including glazing methods.
   2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

L. Preinstallation Conference: Conduct conference at Project site.
1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: Ten (10) years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
1. Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with applicable Building Code. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with applicable Building Code. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.

2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:
1. Silicone; ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned silicone gaskets complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal.
1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.3 GLAZING SEALANTS

A. General: Refer to “Section 07 92 00 Joint Sealants” for glazing sealant products.
1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Single-Component Silicone Glazing Sealants: Refer to “Section 07 92 00 - Joint Sealants” for glazing sealant products.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.4 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: Refer to “Section 07 92 00 - Joint Sealants.”

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Butt-Glazed Lites (if applicable): Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Exposed Edges: Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.8 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.9 GLASS TYPE SCHEDULE (Refer to Drawings for locations of Glass Types)

A. **Glass Type "GL1" - For Daylighting: 1" Insulated Glazing Unit**
   1. Manufacturers/Products to submit for Owner review and approval. Basis of Design:
      a. Exterior Lite: **Solarban 70 (on surface 2) Solargray**
         1) Thickness: ¼"
         2) Tint: Vitro Solargray (or equal)
         3) Low E coating: Solarban 70 (or equal) on surface (2).
      b. Spacer: ½" Air-Filled, with dessicant.
      c. Interior Lite: Clear ¼" thick.
   2. Heat Treatment: Heat-Strengthened in all locations, except Fully-Tempered as indicated on drawings and required by code.

B. **Glass Type "SG1" - Exterior Spandrel: 1" Insulating Glazing Unit Spandrel**
   1. Manufacturers/Products to submit for Owner review and approval:
      a. Exterior Lite: **Solarban 70 (on surface #2) Solargray**
      b. Spacer: ½" (12.7mm) Air-Filled, with dessicant.
      c. Interior Lite: 6mm Clear with opacifier on surface #4 (Medium Gray).
   2. Heat Treatment: Heat-Strengthened in all locations, except Fully-Tempered as indicated on drawings and required by code.

C. **Glass Type "GL2" - Interior, 1/4" Clear Tempered Float:** ¼" thick, Clear Tempered Glass, ASTM C 1048; Type I; Quality-Q3; Class 1 (clear); Kind FT (fully tempered).

D. **Glass Type "GL3" - For Glazed Doors: 3/4" Insulated Glazing Unit**
   1. Manufacturers/Products to submit for Owner review and approval. Basis of Design:
      a. Exterior Lite: **Solarban 70 (on surface 2) Solargray**
         1) Thickness: ¼"
         2) Tint: Vitro Solargray (or equal)
         3) Low E coating: Solarban 70 (or equal) on surface (2).
      b. Spacer: 1/4" Air-Filled, with dessicant.
      c. Interior Lite: Clear ¼" thick.
   2. Heat Treatment: Heat-Strengthened in all locations, except Fully-Tempered as indicated on drawings and required by code.

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Annealed monolithic glass mirrors as indicated on Drawings:

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Samples: For each type of the following products:
   1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
   2. Mirror Clips: Full size.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of mirror and mirror mastic, from manufacturer.

C. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing paint and substrates on which mirrors are installed.

D. Warranty: Sample of special warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.

D. Glazing Publications: Comply with the following published recommendations:
   1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.

2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

E. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing paint and substrates on which mirrors are installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by mirror manufacturer agreeing to replace mirrors that deteriorate, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Deterioration of Mirrors: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

A. Glass Mirrors, General: ASTM C 1503.
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. Arch Aluminum & Glass Co., Inc.
b. Avalon Glass and Mirror Company.
c. Binswanger Mirror; a division of Vitro America, Inc.
d. D & W Incorporated
e. Donisi Mirror Company.
f. Gardner Glass, Inc.
g. Gilded Mirrors, Inc.
h. Guardian Industries.
i. Head West.
j. Independent Mirror Industries, Inc.
k. Lenoir Mirror Company.
l. Maran-Wurzell Glass & Mirror.

m. National Glass Industries.
n. Stroupe Mirror Co., Inc.
o. Sunshine Mirror; Westshore Glass Corp.
p. Virginia Mirror Company, Inc.
q. Walker Glass Co., Ltd.

B. Clear Glass: Mirror Glazing Quality.
1. Nominal Thickness: ¼ inch (6.0 mm).

2.2 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Laurence, C. R. Co., Inc.
b. Palmer Products Corporation.
c. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
2. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 MIRROR HARDWARE

A. Top and Bottom Mirror Clips:
1. Basis-of-Design Product: **"Model 778A - CRL Nickel-Plated Mirror Clips for ¼" Mirror"** as manufactured **C.R. LAURENCE CO., INC.**

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.4 FABRICATION

A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.

B. Cutouts: Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Flat polished.
1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
   1. Mirror Clip Set: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.
   2. Install mastic as follows:
      a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
      b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
      c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION

SECTION 08 91 00

LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. 6" fixed extruded aluminum, drainable wall louvers and frames.

B. Related Sections:
1. Section 04 20 00 - Unit Masonry: Prepared exterior wall openings for louvers.
2. Section 07 27 26 - Fluid-Applied Membrane Air Barriers: Prepared exterior wall openings for louvers.
3. Section 07 92 00 - Joint Sealants: Perimeter sealants at openings for louvers.
4. Division 23 – HVAC: Louvers that are part of mechanical equipment.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.3 COORDINATION

A. Flashings: Coordinate the Work with installation of flashings.

1.4 ACTION 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.
1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of metal finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Company specializing in manufacturing products specified in this Section with minimum five (5) years documented experience.

B. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

C. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."
3. AWS D1.6, "Structural Welding Code - Stainless Steel."

D. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.7 FIELD MEASUREMENTS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 FIELD CONDITIONS

A. Field Measurements: Check actual louver openings by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of the Work.

1.9 WARRANTY

A. Manufacturer’s Finish Warranty: Manufacturer shall provide twenty (20) year limited warranty for fluoropolymer-based finish on aluminum substrates.
1. Finish Coating shall not peel, blister, chip, crack, or check.
2. Chalking, fading, or erosion of finish when measured by the following tests:
a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822
c. Finish coating shall not erode at a rate in excess of .01 mils/year confirmed by Florida test samples.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. 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. Wind pressures shall be considered to act normal to the face of the building.
1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
   1. Design earthquake spectral response acceleration, short period (Sds) for Project is indicated on Structural Drawings.
   2. Component Importance Factor is 1.0.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.
   1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

D. 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.

2.2 6" EXTRUDED ALUMINUM LOUVERS (Mechanical Penthouse Walls)

A. Basis-of-Design: Louvers are based on **"Model ELF6375DXH"** as manufactured by RUSKIN MANUFACTURING, 3900 Dr. Greaves Road, Kansas City, Missouri 64030. Phone (816) 761-7476. Fax (816) 765-8955.
   1. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Description:
   1. Model: **"ELF6375DXH"** RUSKIN
   2. Performance Ratings: AMCA licensed.
   3. Frame:
      a. Material: Extruded aluminum, Alloy 6063-T5.
      b. Wall Thickness: 0.125 inch, nominal.
      c. Depth: 6 inches
      d. Downspouts and caulking surfaces.
   4. 4. Blades:
      a. Style: Drainable.
      b. Material: Extruded aluminum, Alloy 6063-T5.
      c. Wall Thickness: 0.125 inch, nominal.
      d. Angle: 37.5 degrees.
      e. Centers: 5-29/32 inches, nominal.
   5. 5. Bird Screen:
      a. Material: Aluminum, 1/2 inch mesh x 0.063 inch, intercrimp.
      b. Frame: Removable, rewireable.
   6. Gutters: Drain gutter in head frame and each blade.
   7. Downspouts: Downspouts in jambs to drain water from louver for minimum water cascade from blade to blade.
   8. Vertical Supports: Hidden vertical supports to allow continuous line appearance up to 120 inches.
   9. Sill: Steeply angled integral sill eliminating areas of standing or trapped moisture where mold or mildew may thrive and effect indoor air quality.
   10. Blank-Off Panels: 1 inch, aluminum skin, insulated core, factory installed with removable screws and neoprene gaskets.
   11. Extended Sills: Extruded aluminum, Alloy 6063-T5. Minimum nominal wall thickness 0.060 inch (1.5 mm).
   12. Assembly: Factory assemble louver components. All welded construction.

C. Performance Data:
1. Based on testing 48 inch x 48 inch size unit in accordance with AMCA 500.
2. Free Area: 57 percent, nominal.
3. Free Area Size: 9.08 square feet.
4. Maximum Recommended Air Flow Thru Free Area: 1,023 feet per minute.
5. Air Flow: 9,289 cubic feet per minute.
6. Maximum Pressure Drop: 0.15 inches w.g.
7. Water Penetration: Maximum of 0.01 ounces per square foot of free area at an air flow of 1,023 feet per minute free area velocity when tested for 15 minutes.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing to produce uniform appearance.

C. 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.
1. Frame Type: Channel type, unless otherwise indicated.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

F. Provide subsills made of same material as louvers or extended sills for recessed louvers.

G. 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.

2.4 FINISHES

A. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
1. Color and Gloss: Custom color as selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, 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 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 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. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Galvanic Action: Protect unpainted 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 or by separating surfaces with waterproof gaskets or nonmetallic flashing.

G. Weathertightness: Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses where required to make louver joints weathertight. Comply with “Section 07 92 00 - Joint Sealers” for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
   1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD SHAFT-WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Gypsum board shaft wall assemblies.

B. Related Sections:
1. Section 07 92 00 - Joint Sealants: Acoustical sealant.
2. Section 09 29 00 - Gypsum Board: Applying and finishing panels in shaft-wall assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board shaft-wall assembly.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For shaft wall assemblies and firestop tracks, from ICC-ES.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, and bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

C. Stack panels flat on leveled supports off floor or slab to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or with gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.

B. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Fire-Resistance Rating: As indicated, but not less thank 2 hours.

B. STC Rating: As indicated.

C. Studs: Manufacturer's standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated.
1. Depth: 2-1/2 inches, 4 inches, or 6 inches as indicated.
2. Minimum Base-Metal Thickness: 0.033 inch (20 gauge).

D. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.
1. Minimum Base-Metal Thickness: 0.033 inch.

E. Firestop Tracks: Provide firestop track at head of shaft wall on each floor level.

F. Elevator Hoistway Entrances: Manufacturer's standard J-profile jamb strut with long-leg length of 3 inches, matching studs in depth, and not less than 0.033 inch thick.

G. Room-Side Finish: Gypsum board.

H. Shaft-Side Finish: Gypsum shaftliner board, moisture-and mold-resistant Type X.

I. Insulation: Sound attenuation blankets.

2.3 PANEL PRODUCTS

A. Recycled Content of Gypsum Panel Products: Provide documentation of Postconsumer and Preconsumer recycled content in panel products.

B. Regional Materials: Gypsum panel products shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.

C. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

D. Gypsum Shaftliner Board, Moisture- and Mold-Resistant Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with moisture- and mold-resistant core and surfaces.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Corp.; **"ProRoc Moisture"** and **"Mold Resistant Shaftliner"**
   b. Georgia-Pacific Gypsum LLC, Subsidiary of Georgia Pacific; **"Dens-Glass Ultra Shaftliner"**
   c. Continental Building Products.; **"Firecheck Moldcheck Type X Shaftliner"**
   d. National Gypsum Company; **"Gold Bond Brand Fire-Shield Shaftliner XP"**
   e. PABCO Gypsum; **"Pabcore Mold Curb Shaftliner Type X"**

f. Temple-Inland Inc.; **"Fire-Rated SilentGuard TS Mold-Resistant Gypsum Shaftliner System"**
g. USG Corporation; **"Sheetrock Brand Mold Tough Gypsum Liner Panel"**

2. Thickness: 1 inch.
3. Long Edges: Double bevel.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

E. Gypsum Board: As specified in "Section 09 29 00 - Gypsum Board."

F. Cementitious Backer Units: As specified in "Section 09 30 00 - Tiling"

2.4 NON-LOAD-BEARING STEEL FRAMING

A. Recycled Content of Steel: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Framing Members: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
1. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.

C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the 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.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Fire Trak Corp.; **"Fire Trak System"**, with **"Fire Trak Posi Klip"**
b. Grace Construction Products; **"FlameSafe FlowTrak System"**
c. Metal-Lite, Inc.; **"The System"**
d. The Steel Network Inc.; "**VertiClip SLD / VertiTrack VTD"** Series.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with manufacturer's written recommendations.

B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in "Section 09 29 00 - Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written recommendations for application indicated.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
1. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing according to ASTM E 488 conducted by a qualified testing agency.
2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing according to ASTM E 1190 conducted by a qualified testing agency.

E. Acoustical Sealant: As specified in "Section 07 92 00 - Joint Sealants."

F. Sound Attenuation Blankets: As specified in “Section 09 81 16 - Acoustic Blanket Insulation.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board shaft wall assemblies attach or abut, with Installer present, including hollow-metal frames, elevator hoistway door frames, cast-in anchors, and structural framing.
   1. Examine for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged.
   1. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in “Section 07 81 16 - Cementitious Fireproofing.”

B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

A. Install gypsum board shaft-wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated, manufacturer's written installation instructions, and the following:
   1. ASTM C 754 for installing steel framing.
   2. “Section 09 29 00 - Gypsum Board” for applying and finishing panels.

B. Do not bridge building expansion joints with shaft-wall assemblies; frame both sides of joints with furring and other support.

C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
   1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
   2. Reinforcing: Where handrails directly attach to gypsum board shaft wall assemblies, provide galvanized steel reinforcing strip with 0.033-inch minimum thickness of base metal (uncoated), accurately positioned and secured behind at least one layer of face panel.

D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons, elevator floor indicators, and similar items.

E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels, while maintaining continuity of fire-rated construction.

F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

G. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.

H. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.

I. Cant Panels: At projections into shaft exceeding 4 inches, install 5/8-inch-thick gypsum board cants covering tops of projections.
   1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches o.c. with screws fastened to shaft wall framing.
   2. Where steel framing is required to support gypsum board cants, install framing at 24 inches o.c. and extend studs from the projection to shaft wall framing.

J. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.4 WALL PRIORITY

A. Wall Intersections: Intersections of walls shall be installed in accordance with a priority of the highest to lowest. The highest priority wall shall continue uninterrupted (IE. gypsum board layers required on each side of wall shall continue through wall intersection) while the lower priority wall shall abut the other wall.

B. Schedule:

WALL	**PRIORITY**
Two-hour shaftwall:	1 (highest)
Two-hour wall:	2
One-hour shaftwall:	3
One-hour wall:	4
Non-rated wall to deck:	5
Non-rated wall to above ceiling:	6 (lowest)

3.5 PARTITION IDENTIFICATION

A. Stenciling: Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2” high and labeled at 20-foot centers.
   1. Label as “FIRE”, “SMOKE,” and “No. of Hours.”
   2. Non-rated walls that extend to deck shall be labeled “NO WALL RATING REQUIRED.”

3.6 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.

END OF SECTION

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Non-load-bearing steel framing systems for interior gypsum board assemblies.

B. Related Sections:
1. Section 09 29 00 - Gypsum Board: Gypsum board supported by non-load-bearing steel framing.
2. Section 09 81 16 - Acoustic Blanket Insulation: Batt insulation in interior stud walls and above ceilings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.

B. Manufacturer's Certification: Submit manufacturer's certification of product compliance with codes and standards along with product literature and data sheets for specified products.

1.4 QUALITY ASSURANCE

A. Contractor shall provide effective, full time quality control over all fabrication and erection complying with the pertinent codes and regulations of government agencies having jurisdiction. Conduct pre-installation meeting to verify project requirements, substrate conditions, and manufacturer’s installation instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI's "Code of Standard Practice".

PART 2 - PRODUCTS

2.1 PERFORMANCE / DESIGN CRITERIA

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated,

according to ASTM E 119 by, and displaying a classification label from, an independent testing agency acceptable to the authority having jurisdiction.

1. Construct fire-resistance rated partitions in compliance with tested assembly requirements indicated on drawings.
2. Rated assemblies to be substantiated from applicable testing using proposed products, by Contractor.
3. Both metal framing and wallboard manufacturers must submit written confirmation that they accept the other manufacturer's product as a suitable component in the assembly. Acceptance is as follows:
   a. If installation of both products is proper, no adverse effect will result in the performance of one manufacturer's product by the other's product.
   b. Combining products can be substantiated by required assembly tests.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Design framing systems in accordance with American Iron and Steel Institute Publication “Specification for the Design of Cold-Formed Steel Structural Members”, except as otherwise shown or specified.

D. Design Loads: As indicated on the Architectural Drawings or 5 PSF minimum as required by the International Building Code.

E. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
   2. Protective Coating: Comply with ASTM C 645; roll-formed from hot-dipped galvanized steel; complying with ASTM A 1003/A 1003M and ASTM A 653/A 653M G40 (Z120) or having a coating that provides equivalent corrosion resistance. A40 galvannealed products are not acceptable.

B. Studs and Runners: ASTM C 645.
   1. Steel Studs and Runners:
      a. Minimum Base-Metal Thickness: 0.033 inch (20 gauge).
      b. Depth: 3-5/8 inches, 6 inches, 4 inches, 2-1/2 inches, or 1-5/8 inches as indicated on Drawings.

C. Slip-Type Head Joints: Where indicated, provide one of the following:
   1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch-deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
   2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the 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.
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. ClarkDietrich Building Systems **"Blazeframe DSL," "MaxTrak,"** or **"SLP-TRK"** Slotted Deflection Track.
      b. Fire Trak Corp.; **"Fire Trak System"** attached to studs with **"Fire Trak Posi Klip"**
      c. Metal-Lite, Inc.; **"The System"**
   2. Basis-of-Design Product: Subject to compliance with design requirements provide ClarkDietrich Building Systems **"Blazeframe DSL," "MaxTrak," "SLP-TRK"** Slotted Deflection Track, or a comparable product from one of the following:
      1) MBA Building Supplies.
      2) The Steel Network Inc.

E. Backing Plate: Proprietary fire-resistance-treated blocking and bracing in width indicated.
   1. Basis-of-Design Product:
      a. ClarkDietrich Building Systems; **"Danback Fire-Treated Wood Backing Plate D16F**"

F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Metal Thickness: 0.033 inch (nominal 20 gauge).
   2. Basis-of-Design Product:
      a. ClarkDietrich Building Systems; **"Backing Plate**"

G. Channel Bridging and Bracing: Steel, 0.0538-inch (16 gauge) minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
   1. Basis-of-Design Product:
      a. ClarkDietrich Building Systems; **"Spazzer 9200 Bridging and Spacing Bar"**
   2. Depth: 7/8 inch by 7/8 inch by 50 inches.

H. U-Channel Bridging: Steel, 0.0538-inch (16 gauge) minimum base-metal thickness, with minimum 1/2-inch-wide flanges.
   1. Basis-of-Design Product:
      a. ClarkDietrich Building Systems; **"Cold-Formed U-Channel and Easy-Clip U-Series Angle U543, U545, or U547"** to suit stud depth.
   2. Depth: 1-1/2 inches.
   3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.0538-inch (16 gauge) thick, galvanized steel.

I. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 0.033 inch (20 gauge).
   2. Depth: 7/8 inch or 1 ½ inch, as indicated on Drawings.

J. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

K. Headers and Jambs (Contractor's Option): Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges.
   1. Basis-of-Design Product Options:
      a. ClarkDietrich Building Systems; **"Heavy Duty Studs HDS," "Header Bracket HDSC," "ProX Header,"** or **"RedHeader RO."**

2. Minimum Base Metal Thickness: 0.0538 inch (16 gauge).
3. Web and Flange Widths, Type HDS: 3-5/8 by 3 by 1-1/16 by 3/4 inch or 6 by 3 by 2-1/4 by 3/4 inch.
4. Web and Flange Widths, Type HDSC: 3-1/2 by 3-1/16 by 2 inches or 5-7/8 by 3-1/16 by 2 inches.

L. Framed Openings (Contractor's Option): Galvanized steel one piece header and jamb studs meeting or exceeding the requirements of ASTM C754 for conditions indicated below.
1. Basis-of-Design Product Options:
a. ClarkDietrich Building Systems: **"RedHeader RO, HDS Heavy Duty Stud"** and **"HDSC Header Bracket, "ProX Header"**
1) Header Clip: **"RedHeader RO Drop 'N Lok Clip," "ProX Clip," or "HDSC"**
a) Attachment screw pattern per manufacturer's printed literature.
b. Header Flange Length: 3 inch **"HS300 flange"**
c. Jamb Flange Length: 3 inch **"JS300 flange"**
d. Minimum Yield Strength: 33 ksi.
e. Minimum Material Thickness: 0.0329 inches (20 gauge) or as required by design.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls:
1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.3 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
   1. Single-Layer Application: 16 inches o.c., unless otherwise indicated.
   2. Multilayer Application: 16 inches o.c., unless otherwise indicated.
   3. Tile backing panels: 16 inches o.c., unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb, unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
      a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
   5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
   6. Curved Partitions:
      a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
      b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of not less than 2 studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:
   1. Screw to wood or metal framing.
   2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION

SECTION 09 25 23

LIME BASED PLASTERING – CONCRETE MASONRY UNIT (CMU)

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: The work specified in this Section includes a light-weight three-layer application of pure lime plaster directly over a sound mineral, concrete, masonry, or fired-clay surface. Plaster assembly consists of a base “scratch coat” layer of plaster to fill and embed the lath, an intermediate bridge “brown coat” layer of plaster producing a level and smooth surface plane, and a top “finish” layer of plaster with or without color, textured as desired. Specification includes limited surface preparation.

B. Related Sections: Related sections include the following:

1. Section 03 30 00 – Cast-in-Place Concrete
2. Section 04 22 00 – Concrete Unit Masonry
3. Section 09 91 00 – Painting
4. Section 09 97 26 - Cementitious Coatings

1.2 REFERENCES

A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. ASTM Standards

1. ASTM C 78, “Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)”
2. ASTM E 96, “Standard Test Methods for Water Vapor Transmission of Materials”
3. ASTM C 109, “Standard Test Method for Compressive Strength of Hydraulic Cement Mortars”
4. ASTM D 1475, “Standard Test Method for Density of Liquid Coatings, Inks, and Related Products”
5. ASTM C 1549, “Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer”
6. ASTM C 1583, “Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)”
7. ASTM D 1653, “Standard Test Methods for Water Vapor Transmission of Organic Coating Films”
8. ASTM D 2369, “Standard Test Method for Volatile Content of Coatings”

C. Other Standards

1. CE Fire Classification 1A: Non-combustible

1.3 DEFINITIONS

A. Base Coat Plaster: The first layer of plaster.

B. Bridge Coat Plaster: The second layer of plaster.

C. Finish Coat Plaster: The third layer of plaster.

1.4 SYSTEM DESCRIPTION

A. A materials-compatible highly vapor permeable lime plaster system.

1. A three-coat lime plaster system consisting of:

a. A 3/8-inch-thick coarse-grained plaster applied as the first layer (base coat).

b. A 3/8-inch-thick coarse-grained plaster layer applied as the second layer over the base coat with a leveled surface plane finish (bridge coat).

c. A minimum 1/8-inch-thick top layer of a coarse or fine-grained plaster layer with or without integral color applied as the third layer over the bridge coat finished to match surrounding surface texture or as directed by the Architect (finish coat).

d. Total overall plaster system thickness will be minimum 7/8-inch.

2. Where required, apply onto 1/4-inch three-dimensional open-weave self-furring corrosion-free glass fiber lath secured to the substrate.

NOTE: Lath is not required for direct application over mineral, concrete, masonry, or fired-clay surfaces. Use only where code compliance is required.

1.5 SUBMITTALS

A. Product Data: Submit product data showing proposed material. Submit sufficient information to determine compliance with the Drawings and Specifications. Provide published documentation describing materials, characteristics, and limitations.

B. Samples: Submit samples for verification purposes, fabrication techniques, and workmanship.

C. Manufacturer's Instructions: Submit manufacturer's instructions including technical data sheets, safety data sheets, mixing instructions, application requirements, special procedures, and conditions requiring special attention.

D. LEED Submittals: Submittals that are required to comply with requirements for LEED certification include the following:

1. Low Emitting Materials: Submit endorsement by the manufacturer confirming that products meet or are below the volatile organic compound (VOC) limits set by specific agencies or other requirements. Clearly state VOC limits in the submittal.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Provide evidence that Manufacturer is a firm engaged in the manufacture of lime plasters of types required, and whose products have been in satisfactory use in similar service for a minimum of ten years.

2. Applicator Qualifications:

a. Provide evidence Applicator is a firm having a minimum of three years of successful application and craftsmanship experience with projects similar in type and scope to that required for this Project.

B. Mockups:

1. Prior to application of the work, fabricate and erect mockups for each type of finish and application to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution.

2. Build mockups to comply with the following requirements using materials indicated for final unit of work.
3. Locate mockups as directed by the Architect.
4. Demonstrate the proposed range of aesthetic effects and workmanship to be expected in the completed work.
5. Obtain the Architect's acceptance of mockups before start of final unit of work.
6. Retain and maintain mockups during construction in undisturbed condition as a standard for judging completed unit of work.
7. Maintain a record of approved mock up's product mixing and application steps to incorporate into final unit of work to ensure color consistency and textural aesthetics.

C. Tracking Job Progress with Daily Logs

1. Maintain a daily record of the weather conditions, of material ordered and delivered, material used, inspections, areas of work that began, areas of work that were completed, and questions raised, and answers received.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with manufacturer's name, material and product brand name, and manufacturing date and lot number.

B. Store materials in their original undamaged packages and containers inside a sheltered area protected from weather, moisture, and soiling, with air temperatures between 45°F and 85°F and maximum 60 percent humidity.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:

1. Substrate temperature before, during, and after installation must be between 41°F and 86°F.

1.9 WARRANTY

A. Product is warranted to be free from manufacturing defects and to meet the technical properties on the current when used as directed within shelf life. See complete warranty statement on product technical data sheet.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design:

1. Items specified are to establish a standard of quality for design, function, materials, compatibility, performance, warranty, and appearance.
2. Equivalent products by listed manufacturers are acceptable with exception of lime plaster products.
3. The Architect is the sole judge of the basis of what is equivalent.

B. Lime Stucco

1. Material furnished by Owner. Contractor to obtain materials from Owner storage.

2.2 MATERIALS

A. Base Coat: Provide pure lime plaster meeting or conforming to:

1. Premium quality lime, ground limestone and select natural pozzolans in a blended composition with specification-grade white quartz sand.
2. Natural white color may be tinted with iron oxide pigments.
3. pH Balance: Alkaline, greater than 12 pH.
4. Density: 113 pounds per cubic foot
5. Solar Reflectance: 0.83
6. Vapor Permeability: 91 perms at 1/16-inch layer thickness.
7. Fire Rating: Incombustible, Class 1A
8. No VOC.
9. Manufactured as sacked, ready-to-use dry aggregate; add only clean water.
10. Material furnished by Owner. Contractor to obtain materials from Owner storage.

B. Bridge Coat: Provide pure lime plaster meeting or conforming to:

1. Premium quality lime, ground limestone and select natural pozzolans in a blended composition with specification-grade white quartz sand.
2. Natural white color may be tinted with iron oxide pigments.
3. pH Balance: Alkaline, greater than 12 pH
4. Compressive Strength: PSI
5. Density: 104 pounds per cubic foot
6. Solar Reflectance: 0.83
7. Vapor Permeability: 95 perms at 1/16-inch layer thickness.
8. Fire Rating: Incombustible, Class 1A
9. No VOC.
10. Manufactured as sacked, ready-to-use dry aggregate; add only clean water.
11. Material furnished by Owner. Contractor to obtain materials from Owner storage.

C. Finish Coat: Provide pure lime plaster meeting or conforming to:

1. Premium quality lime, ground limestone, select natural pozzolans and biopolymers in a blended composition with specification-grade white quartz sand in choice of grains: from 0 to 0.1 mm (Ultra Fine) or 0 to 0.3 mm (Extra Fine) or 0 to 1 mm (Fine) or 0 to 2.5 mm (Coarse). Natural white color may be pre-colored with iron oxide pigments.
2. pH Balance: Alkaline, greater than 12 pH
3. Compressive Strength: 411 PSI
4. Flexural Strength: 156 PSI
5. Bonding Strength: CMU block – 67 PSI, Porcelain – 56 PSI
6. Density: 102 pounds per cubic foot

7. Solar Reflectance: 0.88
8. Vapor Permeability: 122 perms at 1/16-inch layer thickness.
9. Fire Rating: Incombustible, Class 1A
10. No VOC.
11. Manufactured as sacked, ready-to-use dry aggregate; add only clean water.
12. Material furnished by Owner. Contractor to obtain materials from Owner storage.

D. Glass Fiber Lath: Provide woven glass lath meeting or conforming to:
   1. Open weave three-dimensional self-furred nominal 1/4-inch-thick glass fiber reinforcing lath.
   2. Corrosion-free.
   3. Alkaline resistant.
   4. Maximum allowable weight of plaster assembly: 24 pounds per square foot.
   5. Basis of Design: “BASF PermaLath 1000”, BASF Corporation.

E. Glass Fiber Lath Fasteners: Provide fasteners and washers meeting or conforming to:
   1. Staples: Minimum 16-gauge wire staple with minimum 3/4-inch crown and minimum 1-1/2-inch penetration into framing.
      a. Basis of Design: “P17BAB galvanized chisel staple, 1-inch crown, 1-1/2 inches long”, Senco Brands, Inc.
   2. Screws: Wood type bugle head screw with plastic 1-3/4-inch diameter washer and minimum 1-1/4-inch penetration into framing.
      a. Basis of Design: “#ULP-3WLM1 ULP-302 plastic washer with screw”, select wood-light metal or steel framing fastener, Wind-lock Corporation.

2.3 EQUIPMENT

A. Tools:
   1. Glass Fiber Lath (where required): Typical screw drill or stapling tools.
   2. Plaster mixing: Handheld two-speed plaster/mortar mixer with attached helical mixing paddle.
   3. Plaster mixing: Onsite mixing station for larger projects.
   4. Plaster application by spray equipment or ordinary plastering tools and gauging rods.

2.4 FINISHES

A. Plaster: Finish as directed by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Confirm by examination the areas and conditions under which the work is to be applied for compliance with manufacturer’s instructions. Do not proceed with the work until unsatisfactory conditions have been corrected.
   1. New concrete, stucco, and masonry must be cured minimum 28 days.

2. Verify substrate is secure, sound, dry, and absorbent, and free of construction dust and debris, grease, salts, oil-based paints, release agents, non-mineral-based curing agents, and similar bond breakers.
3. Obtain manufacturer's approval for application over substrates having other pretreatments or priming materials applied.
4. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Applicator.

3.2 PREPARATION

A. Protection: Lay ground cloths and take measures as necessary to protect surfaces subject to contact by products specified by this Section.

3.3 APPLICATION

A. Conform to reviewed product data, manufacturer's written instructions, and provisions of the Contract Documents.

B. Plan the work properly.

1. Ensure surface is free of dust and debris before mixing plaster material.
2. Apply to shaded surfaces in a timely manner working ahead and away from the sun. Avoid direct sun exposure onto wet plaster to ensure proper curing.
3. Do not apply plaster in direct sun, wind, or rain, or when temperature fluctuations exceed 50°F differentials from day to night.
4. In enclosures, provide indirect well-distributed air circulation and ventilation with protective screens to deflect concentrated or forced air onto freshly applied plaster.
5. Moist-cure plaster by flooding surfaces with clean water at 0 PSI (no pressure) over the period of days stated for each plaster coat to ensure complete chemical curing. This technique will completely hydrate the pozzolans in the plaster to prevent streaking from rainfall following project completion.
    a. Begin moisture-curing using "appearance-based determination" for each plaster layer.
    b. As applied plaster dries, the appearance of the plaster changes from dark to light. When dark, it is visibly damp. As water evaporates from the layer, it becomes lighter in contrast to the damp areas. In mid-transition between damp and dry, the surface appears mottled. Once mottling disappears, the moisture-curing cycles can begin.
    c. Weather conditions and plaster layer thickness affect how quickly the plaster transitions from damp to dry. In dry weather, moisture-curing cycles might begin the day of application while in humid weather the cycles might start the following day. Appearance-based determination ensures proper sequencing of the moisture-curing coats for each applied layer of plaster.
    d. Once moisture-curing begins, flood all surfaces including terminations at soffits, inside and outside corners, and window/door returns with clean water. This constitutes one moisture-curing cycle. Moisture-curing cycles continue for the stated number of days for each installed layer of plaster.
    e. Protect cured plaster surfaces from rain during application.

C. Glass Fiber Lath: Install according to manufacturer's written instructions and consultation with manufacturer's technical data sheet.

D. Mixing Methods

1. Bucket Mixing Method: Mix plaster with clean water using helical mixing paddle on a heavy-duty mortar mixing drill motor.
    a. Fill the plaster manufacturer's measuring bucket with clean water to the referenced product margin line.
    b. In a clean 6-gallon plastic bucket, pour half of the measured water.
    c. While stirring the water at low RPM, add plaster from the bag at a rate to prevent clumping of the material. Continue adding water from the measuring bucket and dry plaster until bag is empty.
    d. Once the dry powder is wetted, mix for additional 3 minutes maximum. Allow to rest 5 minutes to fully hydrate and then stir to relax the batch. Over-mixing plaster will cause loss of strength. Keep bucket covered to extend working time to about 1 hour.
2. Onsite Plaster Mixing Station Method: Follow equipment manufacturer's recommendations. Do not mix more water than recommended by the plaster product technical data sheet.
3. Auto-mixing and Spray Application Equipment: Follow equipment manufacturer's recommendations. Do not mix more water than recommended by the plaster product technical data sheet.

E. Base Coat Plaster:
1. Ensure surface is free of construction dust and debris.
2. Surface Hydration:
    a. Do not prewet non-absorbent surfaces.
    b. Prewet mineral-based surfaces relative to their absorbency—highly absorbent surfaces require more hydration. Once water has evaporated from the surface, application may begin.
3. Apply plaster with even distribution filling and embedding glass fiber lath to a minimum 3/8-inch layer thickness.
4. Trowel surface smooth and in plane.
5. Scarify surface to provide light mechanical key for the Bridge Coat.
6. Moist cure for 3 days to ensure bond and proper chemical curing before applying Bridge Coat.
    a. As plaster dries out, its surface develops a mottled appearance.
    b. Before the plaster dries completely out, mist with clean water to re-saturate the surface.
    c. Repeat until 72 hours pass.

F. Bridge Coat Plaster:
1. Ensure surface is free of construction dust and debris.
2. Do not prewet surface.
3. Apply plaster with even distribution to 1/4-inch layer thickness.
4. Trowel surface smooth and level to the surface plane.
5. Moist cure for 3 days to ensure bond and proper chemical curing before applying Finish Coat.
    a. As plaster dries out, its surface develops a mottled appearance.
    b. Before the plaster dries completely out, mist with clean water to re-saturate the surface.
    c. Repeat until 72 hours pass.

G. Finish Coat Plaster:

1. Ensure surface is free of construction dust and debris.
2. Do not prewet surface.
3. Apply plaster with even distribution to 1/16-inch or 1/8-inch layer thickness.
4. Provide finish as directed in Section 2.4 Finishes.
5. Moist cure for 2 days.
   a. As plaster dries out, its surface develops a mottled appearance.
   b. Before the plaster dries completely out, mist with clean water to re-saturate the surface.
   c. Repeat until 48 hours pass.

3.4 CLEANING

A. Clean tools, spills, and accidental drips immediately with plenty of water.

B. Leave applications clean and premises free from residue and debris from work of this Section.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Interior gypsum board.

B. Related Requirements:
1. Section 05 40 00 - Cold-Formed Metal Framing: Structural framing that supports gypsum board.
2. Section 06 16 00 - Sheathing: Exterior plywood sheathing.
3. Section 07 27 23 - Gypsum Board Air Barriers.
4. Section 09 22 16 - Non-Structural Metal Framing: Interior, non-structural framing and suspension systems that supports gypsum board.
5. Section 09 30 00 - Tiling: Cementitious backer units installed as substrates for ceramic tile.
6. Section 09 81 16 - Acoustic Blanket Insulation: Sound attenuation insulation installed in gypsum board partitions.
7. Section 09 91 00 - Painting: Primers applied to gypsum board surfaces.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes.
1. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Continental Building Products.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 1/2 inch.
2. Long Edges: Tapered.

D. Moisture and Mold-Resistant Gypsum Board (Toilet Rooms and Moisture Prone Areas): ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
1. Core: 5/8 inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10.
4. Available Manufacturers/Products;
    a. U.S. Gypsum (Sheetrock® Brand Humitek®)
    b. National Gypsum (Gold Bond Brand XP)
    c. Temple-Inland (Silent-Guard™ TS)
    d. Georgia Pacific (DensArmor® Plus
    e. U.S. Gypsum (FiberRoc® AquaTough™)

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
2. Shapes:
    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. L-Bead: L-shaped; exposed long flange receives joint compound.

e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:
1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat (If required): For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

D. Thermal Insulation: See “Section 07 21 00 - Thermal Insulation.”

E. Acoustical Sealant: See “Section 07 92 00 - Joint Sealants.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install thermal and sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Type X: All vertical surfaces, unless otherwise indicated.
   2. Ceiling Type: Ceiling surfaces.
   3. Moisture- and Mold-Resistant Type: In moisture-prone areas such as bathrooms, kitchens, locker rooms or areas indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Laminating to Substrate (If required): Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
1. Cornerbead: Use at outside corners.
2. Bullnose Bead: Use at outside corners where indicated.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
1. Level 1: Use at ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: (Not Used)
3. Level 3: Use at surfaces receiving medium- or heavy-textured finishes before painting or heavy wallcoverings where lighting conditions are not critical.
4. Level 4: (Standard Exposed Finish): Use at all areas that will be exposed to view, unless otherwise indicated.
5. Level 5 (Limited Use): Use only where specifically indicated on drawings and on curved walls and areas receiving gloss and semigloss enamels.
    a. In addition, provide Level 5 finish in "Main Lobby Areas on all floors," and "Lounge / Reception Area on the First Floor."

3.6 WALL PRIORITY

A. Wall Intersections: Intersections of walls shall be installed in accordance with a priority of the highest to lowest. The highest priority wall shall continue uninterrupted (IE. gypsum board layers required on each side of wall shall continue through wall intersection) while the lower priority wall shall abut the other wall.

B. Schedule:

WALL	**PRIORITY**
Two-hour shaftwall:	1 (highest)
Two-hour wall:	2
One-hour shaftwall:	3
One-hour wall:	4
Non-rated wall to deck:	5
Non-rated wall to above ceiling:	6 (lowest)

3.7 PARTITION IDENTIFICATION

A. Stenciling: Stencil the wall rating on each side of wall above the ceiling. Letters shall be minimum 2" high and labeled at 20-foot centers.
1. Label as "FIRE", "SMOKE," and "No. of Hours."

3.8 Non-rated walls that extend to deck shall be labeled "NO WALL RATING REQUIRED."

3.9 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Porcelain or stone floor and wall tile; mortar bed, thin-set or medium bed.
2. Cementitious backer units installed as part of tile installations.
3. Stone thresholds installed as part of tile installations.
4. Setting and grouting materials.
5. Waterproof and crack-suppression membranes for thin-set or medium bed applications.
6. Trowelable underlayment for transitions between tile and other flooring substrates.
7. Metal edge strips installed as part of tile installations.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete: Monolithic slab finishes for tile substrates.
2. Section 07 92 00 - Joint Sealants: Sealing of tile expansion joints and where tile abuts plumbing fixtures, countertops, and items penetrating tile walls, etc.
3. Division 22 – PLUMBING: Plumbing fixtures and drainage systems.

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. Module Size: Actual tile size plus joint width indicated.

C. Face Size: Actual tile size, excluding spacer lugs.

1.3 PERFORMANCE REQUIREMENTS

A. Dynamic Coefficient of Friction (DCOF): For dimension stone tile and ceramic tile installed on level walkable surfaces, provide products complying with the test protocol provided in the Tile Council of North America (TCNA) A137.1-2012 standard in Section 9.6 (DCOF AcuTest) as follows:
1. Level Interior - Walkable Surfaces When Wet: Minimum 0.42 per DCOF AcuTest criteria.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in “Section 01 31 00 - Project Management and Coordination.” Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each product indicated.

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.

C. Samples:
1. Each type, composition, color, and finish of tile.
2. Assembled samples with grouted joints for each type, composition, color, and finish of tile.
3. Stone thresholds in 6-inch lengths.
4. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product, signed by product manufacturer.

D. Material Test Reports: For each tile-setting and -grouting product.

1.7 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 one (1) box for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to three (3) percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
1. Waterproof membrane.
2. Joint sealants.
3. Cementitious backer units.
4. Metal edge strips.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in “Section 01 31 00 - Project Management and Coordination.” Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

E. Mockups: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 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 requirement in ANSI A137.1 for labeling sealed 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 avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.11 COORDINATION

A. Coordinate installation of tile work with related work.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. Basis-of-Design Products: The design for each tile type is based on the product named in the Finish Schedule on the Drawings.
1. Subject to compliance with requirements, provide the named product or an Architect-approved equivalent in accordance with “Section 01 25 13 - Product Substitutions.”

B. ANSI Ceramic Tile Standard: Provide Standard grade tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

C. 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.

D. 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.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.2 TILE PRODUCTS

A. Basis-of-Design Products: The design for each tile type is based on the product named in the Finish Schedule on the Drawings. Subject to compliance with requirements, provide the named product or an Architect-approved equivalent in accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

B. Granite Thresholds: ASTM C 615, with honed finish.
1. Description: Match Architect's sample.

C. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.
1. Thickness: Nominal ½ inch.
2. Width: Manufacturer's standard width, but not less than 32 inches.

B. Available Products:
1. Custom Building Products; **"Wonderboard"**
2. C-Cure; **"C-Cure Board 990"**
3. FinPan, Inc.; **"Util-A-Crete Concrete Backer Board"-**
4. National Gypsum; **"PermaBase"**
5. USG Corporation; **"DUROCK Cement Board"**

2.5 WATERPROOFING AND CRACK-ISOLATION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. Fluid Applied, single component, flexible waterproofing and crack prevention membrane meeting ANSI A118.10 requirements for waterproofing and is ICC-ES and IAPMO listed as a shower pan liner.
1. Approved Products:
a. **"RedGard Waterproofing & Crack Prevention Membrane"** by CUSTOM BUILDING PRODUCTS; www.custombuildingproducts.com
b. **"Mapelastic 400"** by MAPEI Corporation; www.mapei.com

2.6 CRACK ISOLATION MEMBRANES FOR THIN-SET TILE INSTALLATIONS (As Required)

A. Sheet applied, asphaltic, fabric reinforced, peel and stick crack isolation membrane meeting ANSI A118.12 for High Performance use.
   a. Basis-of-Design Product: **"CrackBuster Pro Crack Isolation Membrane"** by CUSTOM BUILDING PRODUCTS; www.custombuildingproducts.com

2.7 UNCOUPLING MEMBRANE FOR FLOORS (If applicable)

A. Uncoupling Membrane: 1/8 inch (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2 inch x 1/2 inch (12 mm x 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside. Conforms to definition for uncoupling membranes in the Tile Council of North America Handbook for Ceramic Tile Installation; and meet or exceed the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467).
   1. Basis-of-Design Product: **Schluter-DITRA Uncoupling Waterproofing Membrane**.

B. Seaming Tape for Uncoupling Membrane: Waterproofing Membrane 0.004 inch (0.1 mm) thick, orange polyethylene membrane, with polypropylene fleece laminated on both sides, which meet or exceed the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467).
   1. Basis-of-Design Product: **Schluter-KERDI-BAND Seaming Tap**e Waterproofing Membrane.

2.8 SETTING AND GROUTING MATERIALS

A. Available Manufacturers:
   1. CUSTOM BUILDING PRODUCTS.
   2. MAPEI Corporation.
   3. LATICRETE International Inc.
   4. Bonsal, W. R., Company.
   5. C-Cure.

B. Portland Cement Mortar (Thickset) Installation Materials (If required): ANSI A108.1A and as specified below:
   1. Cleavage Membrane: Asphalt felt, ASTM D 226, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
   2. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
   3. Latex Additive: Manufacturer's standard acrylic resin or styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
      a. Basis-of-Design Product: **"Thin-Set Additive"** by CUSTOM BUILDING PRODUCTS.

C. Latex-Portland Cement Mortar (Thin Set & LHT Mortar): ANSI A118.4.
   1. Prepackaged dry-mortar mix containing dry additive to which only water must be added or prepackaged dry-mortar mix combined with liquid-latex additive.
      a. Approved Products:
         1) **"FlexBond"** by CUSTOM BUILDING PRODUCTS
         2) **"Ultraflex 3, Premium-Grade"** by MAPEI Corporation; Polymer-Modified Mortar
   2. For wall applications, provide nonsagging mortar.
      a. Approved Products:

1) **"Prolite"** by CUSTOM BUILDING PRODUCTS
2) **"Ultralite, Lightweight"** by MAPEI Corporation; Polymer-Modified non-sag, Wall and Floor Mortar.

2.9 GROUT MATERIALS

A. Chemical-Resistant, Water-Cleanable, Epoxy Grout: Water-cleanable, 100% solids epoxy grout with high chemical, high-temp and stain resistance. Comply with ANSI A118.3 and ISO 13007.
   a. Approved Products:
      1) **"CEG2000 Commercial Epoxy Grout"** by CUSTOM BUILDING PRODUCTS.
      2) **"Kerapoxy IEG"** by MAPEI Corporation

B. Polymer-Modified Tile Grout (If applicable): ANSI A118.7, color as indicated.
   1. Polymer Type: Liquid-latex form for addition to prepackaged dry-grout mix.
      a. Approved Products:
         1) **"Prism SureColor Grout"** by CUSTOM BUILDING PRODUCTS
         2) **"Ultracolor"** by MAPEI Corporation, Ultra Premium Sanded Grout

C. Grout for Pregrouted Tile Sheets (If applicable): Same silicone rubber used in factory to pregrout tile sheets

2.10 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with TCNA EJ171 Movement Joints, the following requirements and with the applicable requirements in "Section 07 92 00 - Joint Sealants."
   1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
   1. Available Products:
      a. Dow Corning Corporation; **"Dow Corning 786"**
      b. GE Silicones; **"Sanitary 1700"**
      c. Pecora Corporation; **"Pecora 898 Sanitary Silicone Sealant"**

C. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
   1. Available Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Bostik, Inc.; **"Chem-Calk 550**"
      b. Degussa Building Systems; **"Sonneborn Sonolastic SL 2**"
      c. Pecora Corporation; **"Dynatrol II-SG"** or **"NR-200 Urexpan"**
      d. Sika Corporation; **"Sikaflex-2c SL"**
      e. Tremco Incorporated.; **"THC-900," "THC-901"** or **"Vulkem 245"**

D. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

2.11 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.
   1. Basis-of-Design Product: **Skim Coat & Patch** by CUSTOM BUILDING PRODUCTS.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness; metallic, designed specifically for flooring applications.
   1. Provide white zinc alloy, nickel silver, or stainless steel exposed-edge material as selected by Architect.
   2. Locations: Indicated on drawings.
   3. Finish: Satin finish.

C. 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.
   1. Basis-of-Design Product: **"Concentrated Stone & Tile Cleaner by Aqua Mix**," a CUSTOM BUILDING PRODUCTS Company.

D. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.
   1. Basis-of-Design Product: **"Sealers Choice Gold by Aqua Mix,"** a CUSTOM BUILDING PRODUCTS Company.

2.12 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
      c. Verify that depressions and low areas have been filled and prepared for tile installation.

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 prepared and treated in accordance with installation manufacturer's instructions and coordinated with finished tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or that could inhibit proper bonding of thin-set mortars. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Portland Cement Mortar Beds: Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped minimum ¼" per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. 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.

E. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TNCA's "Handbook for Ceramic 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.

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. Grind cut edges of tile abutting trim, finish, or built-in items. 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. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
   1. Locate joints in tile surfaces directly above joints in concrete substrates, or, if using Crack Isolation Membrane, saw cut joints may be relocated to the next nearest grout joint(s).
   2. Prepare joints and apply sealants to comply with requirements in "Section 07 92 00 - Joint Sealants."

H. Thin-set tile to comply with requirements of ANSI A108.5, unless otherwise indicated.

I. Grout tile to comply with requirements of ANSI A108.10, unless otherwise indicated.

J. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
   1. Tile floors in wet areas.
   2. Tile floors composed of tiles 8 by 8 inches or larger.
   3. Tile floors composed of rib-backed tiles.

K. Floor and Wall Joint Widths:
   1. Ceramic Mosaic, Porcelain or Stone Tile: As indicated on Drawings.

L. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
   1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
   2. Do not extend cleavage membrane waterproofing or crack isolation membrane under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on cleavage membrane waterproofing or crack isolation membrane with elastomeric sealant.

M. Underlayment for Concrete Floor Transitions: Mechanically remove laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.
   1. Mix and apply underlayment components according to manufacturer's written instructions.
   2. Feather edges to match adjacent floor elevations.
   3. Maximum slope of transition shall be 1:12.

N. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

O. Grout Sealer: Apply grout sealer to 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 on tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.6 UNCOUPLING MEMBRANE INSTALLATION (If applicable)

A. Install uncoupling membrane to comply with manufacturer's written instructions to produce membrane bonded securely to substrate.

3.7 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
   1. Remove 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. If products containing acid are required, consult grout and tile manufacturer prior to use. Grout must cure a minimum of 10 days prior to the use of any acidic cleaner. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
   3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed. Provide plywood or other protective covering when moving heavy or sharp objects over floor coverings.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.8 INTERIOR FLOOR TILE INSTALLATION SCHEDULE

A. On-Ground Concrete Slab - Interior Floor Installation: Thin-set or LHT mortar; **TCNA F115-15.**
   1. Tile Type: Ceramic, Porcelain or Stone tile.
   2. Thin-Set Mortar: Latex-portland cement mortar.
   3. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

B. On-Ground Young Concrete - Uncoupling Membrane: Thin-set or LHT mortar; **TCNA F128-12**

1. Tile Type: Ceramic, Porcelain or Stone tile.
2. Thin-Set Mortar: Latex-portland cement mortar.
3. Uncoupling Membrane: 1/8" thick **Schluter DITRA,** with Schluter®-KERDI-BAND seaming tape at joints. 1/8" thick plastic with joints sealed with seaming tape. **Schluter DITRA,** with Schluter®-KERDI-BAND seaming tape at joints.
4. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

C. Above-Ground Concrete - Interior Floor Installation: Thin-set or LHT mortar; **TCNA F115A-15 TCNA F122A-15**
1. Waterproof Membrane: Fluid applied, install per ANSI A108.10.
2. Tile Type: Ceramic, Porcelain or Stone tile.
3. Thin-Set Mortar: Latex-portland cement mortar.
4. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

3.9 INTERIOR WALL TILE INSTALLATION SCHEDULE

A. Wood or Metal Studs - Interior Wall Installation: Thin-set mortar over cement or fiber-cement backer board; **TCNA W244C-15** or **TCNA W244F-15**
1. Tile Type: Ceramic, Porcelain or Stone tile.
2. Thin-Set Mortar: Latex-portland cement mortar.
3. Tile Backer Board.
4. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

B. CMU or Concrete Backup: Thin-set mortar; over CMU or concrete backup; **TCNA W202I-15**
1. Tile Type: Ceramic, Porcelain or Stone tile.
2. Thin-Set Mortar: Latex-portland cement mortar.
3. Grout: Epoxy grout.

3.10 BATHTUB/SHOWER WALLS (If applicable)

A. Wood or Metal Studs - Interior Bathtub / Shower Walls: Thin-set mortar over cement or fiber-cement backer board; **TCNA B412-15**
1. Tile Type: Ceramic, Porcelain or Stone tile
2. Waterproof Membrane: Fluid applied, install per ANSI A108.10.
3. Thin-Set Mortar: Latex-portland cement mortar.
4. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

3.11 SHOWER RECEPTORS

A. Shower Receptors - CMU Walls: Thin-set mortar or LHT mortar on CMU or other solid backing; **TCNA B421C-15** or **TCNA B422C-15,**
1. Shower Pan Membrane: Fluid applied, install per ANSI A108.10
2. Waterproof Membrane: Fluid applied, install per ANSI A108.10.
3. Tile Type: Ceramic, Porcelain or Stone tile.
4. Mortar Bed: Sloped portland cement mortar bed. ANSI A108.1A
5. Thinset Bond Coat: Latex-portland cement mortar
6. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

B. Shower Receptors - Backer Board Walls: Thin-set mortar or LHT mortar over cement or fiber-cement backer board; **TCNA B415-15**
1. Tile Type: Ceramic, Porcelain or Stone tile.

2. Shower Pan Membrane: Fluid applied, install per ANSI A108.10
3. Waterproof Membrane: Fluid applied, install per ANSI A108.10.
4. Thin-Set Mortar: Latex-portland cement mortar.
5. Grout: Epoxy grout - ANSI 118.3 or ISO RG.

3.12 MOVEMENT JOINTS

A. Follow **TCNA EJ171 Movement Joint Guidelines for Ceramic, Glass, and Stone** where joints are indicated on drawings.

END OF SECTION

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Acoustical panels and exposed suspension systems for ceilings.
   2. Suspended metal ceiling systems
   3. Ceiling-hung acoustical panels.

B. Related Sections:
   1. Section 07 92 00 - Joint Sealants: Acoustical sealants.
   2. Section 09 29 00 - Gypsum Board.

1.2 PREINSTALLATION MEETINGS

1.3 Preinstallation Conference: Conduct conference at Project site.

1.4 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition assemblies (if any).

1.5 ACTION SUBMITTALS

A. Product data for each type of product specified.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with manufacturer's labels clearly describing contents.
   1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed.
   2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Build mockup of typical ceiling area as shown on Drawings.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and HVAC is operational and reasonable construction condition exists as not to affect the performance or warranty of the finish materials.
   1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
   2. Smoke-Developed Index: 450 or less.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

C. Humidity/Sag Resistance & Mold/Mildew Resistance: Provide for clean room type tiles

2.2 ACOUSTICAL AND METAL PANELS, GENERAL

A. Source Limitations:
   1. Ceiling Panels: Obtain each type from single source from single manufacturer.
   2. Suspension System: Obtain each type from single source from single manufacturer.

B. Source Limitations: Obtain each type of ceiling panel and supporting suspension system from single source from single manufacturer.

C. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.

D. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
   1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.

E. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
   1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL CEILING PANELS

A. Basis-of-Design Manufacturers/Products: Acoustical Ceiling Panels are based on products indicated on the Interior Finish Schedule on the Drawings. Subject to compliance with requirements, provide the named product or a comparable product approved by the Architect.
   1. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”
   2. Blades installed using individual suspension hanging.

2.4 METAL CEILING PANELS

A. Basis-of-Design Manufacturers/Products: Metal Ceiling Panels are based on products indicated on the Interior Finish Schedule on the Drawings. Subject to compliance with requirements, provide the named product or a comparable product approved by the Architect.
   1. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”
   2. Provide acoustical fiberglass fleece backing for perforated panels and blades.
   3. Provide all necessary suspension frames and accessories for hanging.
   4. Blades provided with field-installed matching caps.
   5. Blades installed on Prelude Heavy-Duty 15/16” suspension systems, white or black as selected by interior designer

2.5 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.
   1. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
      a. Type: Cast-in-place, post-installed expansion, or post-installed bonded anchors.
      b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
   2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
   1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
   2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

D. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

F. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

2.6 METAL SUSPENSION SYSTEMS

A. Basis-of-Design Manufacturers/Products: Metal suspension system is based on products indicated on the Interior Finish Schedule on the Drawings. Subject to compliance with requirements, provide the named product or a comparable product approved by the Architect
   1. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

B. Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 (Z90) coating designation; with prefinished 9/16-inch-wide metal caps on flanges.
   1. Structural Classification: Intermediate-duty system.
   2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
   3. Cap Material: Steel or aluminum cold-rolled sheet.

4. Cap Finish: Painted in color as selected from manufacturer's full range.

C. Metal Drywall Suspension System: Extra-wide-face, single-web, main and cross runners formed from steel-capped steel to produce structural members with 1-1/2-inch-wide flanges.
1. Acceptable Manufacturers: Subject to compliance with requirements, provide products one of the following manufacturers:
a. Armstrong World Industries, Inc.
b. United States Gypsum Company.
c. Chicago Metallic by Rockfon, LLC;
2. Structural Classification: Heavy-duty system.
3. Face Design: Flat, flush.
4. Face Finish: Painted white.

2.7 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
2. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
3. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

2.8 ACOUSTICAL SEALANT

A. Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. Refer to “Section 07 92 00 - Joint Sealants” for products.
1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
   1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Do not splay hangers across open ceiling area where wires can be seem from floor below (at ceiling “cloud” areas where ceiling grid is recessed away from walls).
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, post-installed mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or post-installed anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
2. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
6. Protect lighting and air ducts to comply with reqs. indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage. Protect panels from painting and construction dust.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient wall base.
   2. Resilient molding accessories.

B. Related Sections:
   1. Section 09 30 00 - Tiling: Tile base.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product specified.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: Include manufacturer’s cleaning requirements for resilient base and accessories in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockups at locations and in sizes as directed by Architect.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, project identification, and shipping and handling instructions.

B. 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.

1.7 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.

1.8 SEQUENCING AND SCHEDULING

A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

PART 2 - PRODUCTS

2.1 RESILIENT WALL BASE

A. Wall Base Manufacturers/Products: Basis-of-Design wall base and accessories are based on products indicated on the Finish Schedule on the Drawings.
   1. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

B. Rubber Wall Base: Products complying with ASTM F 1861, and as follows:
   1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
   2. Manufacturing Method: Group I (solid, homogeneous).
   3. Styles: As indicated on Finish Schedule
   4. Minimum Nominal Thickness: 1/4 inch.
   5. Height: As indicated on Finish Schedule.
   6. Lengths: Coils in lengths standard with manufacturer but not less than 100 feet.
   7. Exterior Corners: Job-formed only.
   8. Interior Corners: Job-formed only.
   9. Finish: As selected by Architect from manufacturer's full range.
   10. Colors and Patterns: Refer to Interior Finish Schedule on the Drawings.

2.2 RESILIENT MOLDING ACCESSORIES

A. Rubber Transition Strips: Extruded or molded heavy-duty rubber, minimum 1-5/8-inch-wide anchorage flange, and as follows:

1. Profile and Dimensions: As indicated on drawings.
2. Color: As selected by Architect from manufacturer's full range of colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
1. Adhesives shall have VOC content of 50 g/L or less.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

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 and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they will be installed.
1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12inches in length.
   a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
   a. 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 protection of resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 65 19

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Luxury Vinyl Tile (VCT) and accessories.

B. Related Sections:
1. Section 09 65 13 - Resilient Base and Accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: Full-size units of each color and pattern of floor tile or plank required.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.5 MATERIALS MAINTENANCE 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. Floor Tile: For each type of floor tile, furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation indicated.
1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups for floor tile including resilient base and accessories.
a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 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.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive floor tile 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. 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT FLOOR TILE

A. Manufacturers/Products: All types of resilient floor tile/plank and accessories are based on products indicated in the Interior Finish Schedule. Subject to compliance with requirements, provide the named product or a comparable product approved by Architect.
   1. Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
   1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Vinyl Composition Tile Adhesives: 50 g/L or less.
      b. Rubber Floor Adhesives: Not more than 60 g/L.

C. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare 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 manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
   4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
      a. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are same temperature as space where they are to be installed.
   1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing each type of 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.
   1. Pattern: Lay floor tiles with grain running in one direction unless otherwise indicated.

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.
   1. Lay tiles in pattern of colors and sizes indicated.

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, nonstaining marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring 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.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.

B. Perform the following operations immediately after completing floor tile installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor tile surfaces before applying liquid floor polish.
   1. Apply two coats.

E. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 096623

Resinous Matrix Terrazzo

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. Reference Architectural and Structural scopes for related work. As the Terrazzo installation is contingent upon the quality and performance criteria of other work, the General Contractor is responsible for coordinating scopes of work and ensuring that the various systems are installed to allow for terrazzo installation to meet specified requirements. Should any previous work installed not be sufficient for the installation of terrazzo, the Contractor is to remedy subfloor/base conditions at his cost to provide suitable conditions for the installation of new terrazzo work. Terrazzo shall be installed and finished prior to the installation of millwork.

1.2 SUMMARY

A. Section Includes:

1. Thin-set, epoxy-resin terrazzo flooring.
2. Precast epoxy-resin terrazzo base, elevator flooring, etc.

1.3 DEFINITIONS

A. Aggregate: Marble chips or other types of aggregate.

1.4 PRE INSTALLATION MEETINGS

Pre-installation Conference: Conduct conference at Project site.

A. Review methods and procedures related to terrazzo including, but not limited to, the following:

1. **Inspect and discuss condition of substrate and preparatory work performed by the terrazzo installer and other trades.**
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays. **It is the responsibility of the terrazzo subcontractor to make the owner aware of any problems, changes, etc. at this time.**
3. Review special terrazzo designs and patterns.
4. At least one representative from the terrazzo subcontractor who was in attendance for the pre

installation meeting MUST also be in attendance during the mock-up process (meetings, reviews, etc.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control-joint strips.
3. Accessory strips.
4. Abrasive strips.
5. Stair treads, risers, and landings.
6. Precast terrazzo jointing and edge configurations.
7. Terrazzo patterns.

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Initial Selection: NTMA color plates showing the full range of colors and patterns available for each terrazzo type.

E. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. **The complete formula must be provided on the back of each color submittal**. Prepare Samples of same thickness and from same material to be used for the Work, in size indicated below:

1. Terrazzo: 6-inch square Samples.
2. Precast Terrazzo: 6-inch square Samples.
3. Accessories: 6-inch long Samples of each exposed strip item required.

Provide individual bags of each aggregate or material listed in each formula in the size specified. Provide a quantity of three bags per aggregate or material. Each bag must be clearly labeled with the name of the aggregate or material and the size. From this point forward, the name provided should be consistent throughout the project when referring to the product or for labeling purposes. If a change becomes necessary, the new product will have to be resubmitted for approval.

All samples, data, etc. referenced above MUST be submitted as a complete package no later than twenty-one days from the LOI or NTP, whichever is received first by the contractor . The designer cannot review the submittal if it is not complete.

1.6 INFORMATION SUBMITTALS

A. Qualification Data: For the Installer.

B. Material Certificates: For each type of terrazzo material or product, from manufacturer.

C. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

1.7 CLOSE OUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Engage an installer who is a contractor member of NTMA.

2. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

3. Installer shall have completed a minimum of three epoxy terrazzo installations within the past 5 years of scale and complexity similar to the proposed installation. The project name, location, quantity of terrazzo, floor pattern plan, and project contact information, etc. **must be provided to the University at the Prebid meeting.**

4. The general contractor shall provide the terrazzo subcontractor contact information when submitting his bid.

B. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

C. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

D. NTMA Standards: Comply with NTMA's Terrazzo Specifications and Design guide and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

E. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for terrazzo including accessories.

a. Size: **Minimum 100 sq. ft**. See Floor Pattern Plan for location and pattern extent of the mock-up. Include divider strips, etc. as specified herein. The mock-up should be polished and finished as per the specification requirements. **The UA Designer and Architect must approve each color pour before the next pour can begin.**

b. Include first three stair treads in the terrazzo color specified on the Finish Schedule.

c. Include 8'-0" length of terrazzo base at the height specified in the Finish Legend.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless the University Architect specifically approves such deviations in writing.

3. Once approved the mock area will be clearly marked with tape that should remain in place for the duration of the project, so that control sample can be easily identified later.

4. No other terrazzo work, other than surface preparation, may take place before the mock-up is approved. This includes setting the divider strips for the terrazzo pattern. **Any work installed by the terrazzo subcontractor before the mock-up is approved is done so at the risk and expense of the subcontractor, unless written approval is provided by the University of Alabama's project designer.**

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with the sources or manufacturer's name, material or product brand name, and lot number if any. Labeling should be consistent with product labeling from the submittal process.

B. Store materials in their original, undamaged packages and containers, inside a well- ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.10FIELD CONIDTIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 EPOXY RESIN TERRAZZO

A. Epoxy-Resin Terrazzo: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing unless more stringent requirements are specified.

1. Products: Subject to compliance with requirements, provide the following:
   a. Key Epoxy Terrazzo by Key Resin Company
   b. Terroxy Resin System by Terrazzo Marble and Supply Companies
   c. Additional manufacturer's must submit for approval at least ten working days prior to the bid date
2. Thickness: 3/8 inch nominal.
3. Color and Pattern: See Finish Legend.
4. Polish Level: Polish to a **1500 grit** unless otherwise indicated in writing by the University of Alabama project designer.

B. Materials:

1. Flexible Reinforcing Membrane: Manufacturer's resinous membrane for substrate-crack preparation and reflective-crack reduction.
   a. Key 580 Floor Aid Flexible Membrane 528 or equal
2. Vapor Barrier: Manufacturer's vapor barrier.
   a. Key Epocoat: if readings are 80% or above. Install per manufacturer's recommendations.
3. Primer: Manufacturer's product recommended for substrate and use indicated.
4. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
   a. Physical Properties without Aggregates:
      1) Hardness: 60-85 per ASTM D 2240, Shore D.
      2) Minimum Tensile Strength: 9000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.

3) Minimum Compressive Strength: 12,000 psi per ASTM D 695, Specimen B cylinder.

4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.

a) Distilled water.

b) Mineral water.

c) Isopropanol.

d) Ethanol.

e) 0.025 percent detergent solution.

f) 1.0 percent soap solution.

g) 10 percent sodium hydroxide.

h) 10 percent hydrochloric acid.

i) 30 percent sulfuric acid.

j) 5 percent acetic acid.

5) Physical Properties with Aggregates: For resin blended with Georgia white marble, ground, grouted, and cured per requirements in NTMA's "Terrazzo Specifications and Design Guide"; comply with the following:

a. Flammability: Self-extinguishing, maximum extent of burning 1/4 inch per ASTM D 635.

b. Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per degree F for temperature range of minus 12 to plus 140 degree F per ASTM D

6) Aggregates: Comply with NTMA gradation standards for mix indicated and con tain no deleterious or foreign matter.

a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
b. 24-Hour Absorption Rate: Less than 0.75 percent.
c. Dust Content: Less than 1.0 percent by weight.

7. Finishing Grout: Resin based.

2.3 PRECAST EPOXY-RESIN TERRAZZO

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Key Epoxy Terrazzo
2. Terroxy

B. Precast Terrazzo Units: Comply with NTMA's written recommendations for fabricating precast terrazzo units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to 1/8- inch radius.

1. Stair treads and risers and stringers: Provide treads and risers at 3/8" thickness, minimum. See Architectural plans for stair details and additional information. Color, etc. See Finish Schedule/Legend: See Floor Pattern Plan for additional information.
2. Wall Base: Provide wall base 3/8" thick with eased edge, straight profile. See Finish Legend for base height. Color, etc.: See Finish Schedule/Legend.

2.4 STRIP MATERIALS

A. Thin-Set Divider Strips: L-type angle, 1/4 inch deep.

1. Material: **White-zinc alloy** unless otherwise indicated in writing.
2. Top Width: **1/8 inch** unless otherwise indicated in writing from UA project designer.

B. Control-Joint Strips: Separate, double L – type angles, positioned back to back, with ¼" gap for sealant that match material and color of divider strips and in depth required for topping thickness indicated.

C. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosing for terrazzo stair treads and landings.

D. Abrasive Strips: Abrasive nosing strip and two-line abrasive inserts at nosing. Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.

1. Width: 1/2 inch.
2. Depth: As required by terrazzo thickness.
3. Length: 4 inches less than stair width.
4. Color: Match adjacent poured-in-place terrazzo flooring **except where the ADA code requires a contrasting strip.**

2.5 MISCELLANEOUS ACCESSORIES

A. Anchoring Devices:

1. Strips: Provide mechanical anchoring devices or adhesives for strip materials as recommended by manufacturer and required for secure attachment to substrate.
2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.

B. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected and approved by the Architect and UA designer.

3.2 PREPARATION

A. **Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.**

B. Concrete Slab:

1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and re-circulates the shot by vacuum pickup. Surface should be a minimum of CSP 3. Architect and Designer must be on site during this process and approve the condition of the surface.

b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.

c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.

C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests indicated below.

In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Measurements must be made using Wagner Electronics Rapid RH 4.0 Smart Sensor and Rapid RH Easy Reader. If measurement readings less than 80% RH are obtained then a moisture vapor barrier System is not required between the concrete slab and the terrazzo floor. If measurement readings are obtained in the range of 80% - 89% RH then Terrazzo Moisture Vapor Shield (MVS 601) must be applied to the concrete prior to terrazzo floor application. If measurement readings 90% and greater are obtained the Terrazzo Vapor Shell (MVB) system must be applied to the concrete prior to terrazzo application.

D. Vapor Barrier:

E. Manufacturer's vapor barrier:

1. Key Epocoat Primer: if relative humidity readings are 80% or above provide. Install per manufacturer’s recommendations.

F. Flexible Reinforcing Membrane:

1. Prepare and prefill substrate cracks with rigid epoxy material.

2. Install membrane and fiberglass scrim over cracks in areas to receive terrazzo.

3. Install flexible membrane to provide full coverage in areas to receive terrazzo.

4. Prepare membrane according to manufacturer's published instructions before applying primer and broadcast.

5. **Schedule installation of membrane so that it remains free of contaminates until the terrazzo is poured**.

6. After membrane has cured, apply another coat of primer with sand broadcast to rejection. Primer to be 10-12 mils. After the primer has cured, sweep off excess sand.

G. Joint Treatments and Strip Conditions: All of the following joint types and divider/accessory strip conditions are to be scoped, coordinated, located through the shop drawing process, and reviewed during the pre-installation conference.

1. Divider and Control-Joint Strips:

   a. Divider Strips: Locate divider strips in locations indicated on the Floor Pattern Plan. **The Architect and Interior Designer must review and approve the layout in the field before the strips can be attached with adhesive and prior to installation of the epoxy terrazzo materials**.

   b. Once approved, install divider strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.

   c. Control Joints for Panel Expansion or at Expansion Joints in Concrete (slab on grade or elevated deck locations): Due to the rate of expansion, the contractor must install control joints to allow for expansion at a maximum of 30' spacing either way. Joint locations should be clearly indicated on shop drawings to show individual panels for review by Architect and Interior Designer. Panel expansion control joints are preferred to be coordinated to coincide with the pattern design. Where large expanses of glass occur and therefore, heat gain, locate control joints in 15' spacing either way. In all cases, the shop drawings must reconcile the location and frequency of joints between the project design and the terrazzo Contractor.

   d. Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap. **Sealant to match matrix color it passes through**.

   e. Control Joints at locations of Vertical Movement: Column block-outs, concrete isolation joints or subfloor conditions prone to shear vertically.

   f. Install control-joint strips back to back (without separation for sealants) directly above concrete-slab control joints or in locations indicated. The locations, straightness and quality of saw-cutting joints is to be coordinated and reviewed during the Pre-Installation Conference for Slab-on-Grade installation to ensure joints, column block-outs, etc. are optimally located.

g. Divider Strips at Saw-cut Slab Joints (Slab on Grade): Typically saw-cut joints in concrete (used to prevent shrinkage cracks in a slab) are not subject to vertical movement. In most cases, these joints can be treated with joint treatment and a single “L” divider strip.

2. Accessory Strips: Install as shown on Floor Pattern Plans.

3. Abrasive Strips: Install with surface of abrasive strip positioned 1/16 inch higher than terrazzo surface.

4. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.

5. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

H. **Roll neat liquids onto CLEAN broadcast layer**. **The epoxy should be poured immediately so as to avoid contamination.**

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

A. Comply with NTMA's written recommendations for terrazzo and accessory installation.

B. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."

C. Installation Tolerance: Limit variation in terrazzo surface from level to 1/8 inch in 10 feet; noncumulative.

D. The project designer must be on site to approve each color pour before the terrazzo installer can begin the next color pour. The designer must be given 24 hour notice before each pour begins.

E. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.

F. Delay fine grinding until heavy trade work is complete and construction traffic through the area is restricted. During the interval, the terrazzo subcontractor shall provide protection to the floor with a product that will ensure it will not be damaged before final grinding or polishing occurs. The product must meet the approval of the Architect. The terrazzo installer shall coordinate the final polishing schedule with the General Contractor.

3.4 PRECAST TERRAZZO INSTALLATION

A. Install precast terrazzo units using method recommended by NTMA and manufacturer unless otherwise indicated.

B. Do not install units that are chipped, cracked, discolored, or not properly finished.

C. Seal joints between units with joint compound matching precast terrazzo matrix

3.5 REPAIR AND REPLACE

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate or as directed by the Architect due to color or workmanship defects. Cut out terrazzo areas in panels defined by strips and replace, or repair panels to match the Floor Pattern Plan according to NTMA's written recommendations, and as approved by the Architect.

3.6 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with chemically neutral cleaner with pH factor between7 and 10 that is biodegradable, phosphate free, and recommended by sealer use on terrazzo type indicated.
3. Rinse surfaces with water and allow them to dry thoroughly before sealing.

B. Sealing:

1. Prior to sealing, installer must confirm that all dirt, dust, debris, etc. has been removed from the surface of the floor.
2. Designer must approve the floor prior to sealing and Diversey Plaza Plus must be on the job site at that time.
3. **Seal surfaces according to NTMA's written recommendations with Diversey Plaza Plus sealer in accordance with the University of Alabama and used on previous projects. Other sealers will not be accepted.**
4. Apply sealer according to sealer manufacturer's written instructions.
   a. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   b. Acid-Base Properties: With pH factor between 7 and 10.

c. Sealers shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Protection:

1. Provide final complete coverage protection with Scudo Board, tape all joints and maintain conditions in a manner acceptable to the University of Alabama that ensures the terrazzo will not be damaged or deteriorate until substantial completion of the project.

END OF SECTION 096623

RES-TEK®
Acrylic Flooring & Concrete Repair Solutions

PART 1 - General

1.1. Related Documents

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

1.2. Summary

A. This section includes the following:

1. Seamless, cementitious urethane flooring system as shown on drawings and schedules

B. Related sections include the following:

1. Cast-in-Place Concrete, section 03 30 00
2. Concrete Curing, section 03 39 00

1.3. System Description

A. The work shall consist of preparation of the substrate, the furnishing and application of a urethane cement based self-leveling seamless flooring system with sand broadcast and topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 1/4 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations

B. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted

1.4. Submittals

A. Product data sheets for each type of product indicated including tech data, application instructions, and recommendations for each component required

B. A minimum of 4” square sample of the specified flooring system

1. The installed flooring system shall be like the accepted sample in thicknesses of respective film layers, color, texture, overall appearance and finish

C. The manufacturer’s safety data sheets for the components being installed (SDS)

1.5. Quality Assurance

A. No request for substitution shall be considered that would change the generic type of floor system specified. Equivalent materials of other manufactures may be substituted only on approval of Architect or Engineer. Request for substitution will only be considered only if submitted 10 days prior to bid date. Request will be subject to specification requirements described in this section

B. Pre-qualification requirements: Each bidder for this project shall be prequalified and approved by the material manufacturer at the time of bid submittal. Acceptability will include judgement on equipment, history, and financial strength. In no case will Res-Tek Inc. allow the application of any of its materials by untrained, non-approved Contractors or personnel

1. Each approved applicator shall have been trained by the Manufacturer in all phases of surface preparation and application of the specified flooring system

2. Each approved applicator must have five years of experience installing the specified flooring system and submit a list of five projects/references as a prequalification requirement of equal size, quantity, and magnitude to this project as a prequalification requirement. Owner has the option to personally inspect the projects/references to accept or reject any of the Contractors prior to bid time as a prequalification requirement

C. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section

D. A pre-installation conference shall be held between Applicator, General Contractor, and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6. Delivery, Storage, and Handling

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data sheet

1.7. Project/Site Conditions

A. Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application

B. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period

D. Conditions required of new concrete to be coated with urethane cement materials

1. Concrete shall be moisture cured for a minimum of 7 days at 70° F. The concrete must be fully cured for a minimum of 10 days prior to application of the coating system
2. Surface contaminants such as curing agents, membranes, or other bond breakers should not be used
3. Concrete shall have a rubbed, float, or darby finish. A hard steel trowel is neither necessary nor desirable
4. Drains should be set to the concrete grade rather than raised to the finished grade of the topping

E. If any of the above conditions are not met, consult with your Res-Tek sales representative

1.8. Warranty

A. Res-Tek Inc. warrants that materials shipped to buyers are at the time of shipment substantially free from material defects and will perform substantially according to Res-Tek's published literature if used strictly in accordance with Res-Tek's prescribed procedures and prior to expiration date. For more details please request a copy of a sample warranty statement

RES-TEK®
Acrylic Flooring & Concrete Repair Solutions

PART 2 - Products

2.1. Resinous Flooring

A. Acceptable Manufacturer:

1. Res-Tek Inc. 110 Riverside Drive Cartersville, Georgia 30120, PH: (770) 427-4034, (888) 737-8351, FAX: (770) 427-4037

B. Products: PUR-Guard HD-SL (Self-Leveling) System, Basis of Design

C. Characteristics:

1. Color and pattern selected from the manufacturer's standards
2. Wearing surface: standard
3. Integral cove base: TBD
4. Overall system thickness 1/4"

D. Components

1. Primer (if required)
    a. Only required when out-gassing of concrete is present, installing a test patch maybe required to determine if priming is necessary
    b. Material basis: PUR-Primer
    c. Resin type: Urethane
    d. Formulation description: single component, medium viscosity
    e. Application method: roller applied
    f. Number of coats: (1) one
2. Body Coat:
    a. Material Basis: PUR-Guard HD-SL
    b. Resin type: Cementitious Urethane
    c. Formulation description: (3) component, medium viscosity
    d. Application method: Gauge rake or cam rake
        I. Thickness: 3/16"
        II. Number of coats: (1) one
3. Broadcast
    a. Material basis: Res-Tek Sand
    b. Formulation description: Industrial Silica (#0 or #00 grade)
    c. Finish: Broadcast to rejection
4. Topcoat:
    a. Material basis: PUR-Guard HD-TC
    b. Resin type: Cementitious Urethane
    c. Formulation description: (3) component, low viscosity
    d. Type: Solid color, color TBD by owner
    e. Number of coats: (1) one

2.2. Accessory Materials

A. Patching, leveling, and fill materials: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated

B. Joint sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated

2.3. System Characteristics

A. Percent solid: 100%

B. Tensile strength: 950 psi per ASTM D638

C. Modulus of elasticity: 19,500 psi per ASTM C722

D. Hardness: 0.77 per ASTM D2240

E. Compressive strength: 5,800 psi per ASTM C109

F. Abrasion resistance: 25 mg. loss per ASTM D4060

G. Water absorption: <0.1% per ASTM F3191

H. Impact resistance: No damage at minimum 160 in.-lb. per ASTM D2794

PART 3 - Execution

3.1. Preparation

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean and dry substrate for resinous flooring application

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring

1. All accessible concrete deck surfaces shall be mechanically blast cleaned using a mobile steel shot, dust recycling machine such as BLASTRAC®, as manufactured by BLASTRAC, NA, or approved equivalent. All surface and embedded accumulations of paint, toppings, hardened concrete layers, laitance, power trowel finishes, and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a profile of CSP 4 or higher according to the Concrete Repair Institute’s Concrete Surface Profile Scale and exposing the upper fascia of concrete aggregate
2. Areas inaccessible to the mobile blast cleaning machines shall be mechanically abraded to the same degree of cleanliness, soundness, and profile using vertical disc scarifiers, scarifiers, needle guns, scabblers, or other suitably effective equipment

C. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations

D. Verify that concrete substrates meet the following requirements

1. Perform in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 98 percent

2. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 20 lbs of water/1000 sq. ft. of slab in 24 hours
3. If these conditions cannot be met, discuss additional recommendations with your Res-Tek sales representative

E. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions

F. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations

3.2. Application

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes
3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations
    a. Apply joint sealant to comply with manufacturer's written recommendations

B. Primer (if required): Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates

C. Integral cove base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and top coating of cove base. Round internal and external corners. Refer to detail drawings

D. Body coat: Mix base material according to manufacturer's recommended procedures. Uniformly spread mixed material over previously primed substrate using manufacturer's installation tool. Spread material with strict adherence to manufacturer's installation procedures and coverage rates

E. Broadcast: Immediately broadcast clean and dry industrial silica into the body coat. Strict adherence to manufacturer's installation procedures and coverage rates is imperative

F. Topcoat: Remove excess un-bonded silica by brushing and vacuuming the floor surface. Mix and apply topcoat with strict adherence to manufacturer's installation procedures

3.3. Terminations

A. Chase edges to anchor the system into the substrate along the lines of termination

B. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks

C. Treat floor drains by chasing the coating to lock in place at point of termination

3.4. Joints and Cracks

A. Treat control joints to maintain a monolithic system

B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces

C. Vertical and horizontal contraction and expansion joints are treated by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered

3.5. Field Quality Control

A. On site test and inspections performed by the approved applicator

1. Air, substrate temperatures and, if applicable, dew point
2. Rate for all layers to be monitored by checking quantity of material used against the area covered

3.6. Curing, Cleaning, and Protecting

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General Contractor is responsible for cleaning prior to inspection

End of section 096723

SECTION 09 81 16

ACOUSTIC BLANKET INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Formaldehyde-free sound attenuation insulation for interior metal stud partitions.

B. Related Sections:
1. Section 07 21 00 - Thermal Insulation.
2. Section 09 22 16 - Non-Structural Metal Framing: Metal stud partitions to receive acoustic blanket insulation.
3. Section 09 29 00 - Gypsum Board.

1.2 REFERENCES

A. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2001.

B. ASTM C1104 - Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.

C. ASTM C1304 - Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.

D. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2001.

F. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

G. ASTM E119, - Test Methods for Fire Tests of Building Construction and Materials.

H. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C; 1999.

I. ASTM E970 - Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:
1. Test data showing compliance of products with specified requirements.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
1. Surface-Burning Characteristics: ASTM E84.
2. Fire-Resistance Ratings: ASTM E119.
3. Combustion Characteristics: ASTM E136.

1.6 DELIVERY, STORAGE AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources.

B. Store inside and in a dry location.

C. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.7 SEQUENCING

A. Sequence work to ensure firestopping materials are in place before beginning work of this section.

PART 2 - PRODUCTS

2.1 FORMALDEHYDE-FREE, UNFACED GLASS FIBER INSULATION

A. Formaldehyde-Free, Unfaced Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; and of the following properties:
1. Thermal Resistance (R-Value): As indicated on drawings.
2. Combustion Characteristics: Passes ASTM E136.
3. Critical Radiant Flux: ASTM E970, greater than 0.11 Btu/sq ft s.
4. Water Vapor Sorption: ASTM C1104, 5 percent or less.
5. Odor Emission: Passes ASTM C1304.
6. Corrosiveness: Passes ASTM C665.
7. Fungi Resistance: Passes ASTM C1338.
8. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 18 percent post-consumer and seven (7) percent pre-consumer recycled glass product, on average of manufacturer’s products.
9. Thickness: As Indicated on drawings.
10. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
11. Sustainability Requirements:

a. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
b. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

B. Basis-of-Design Manufacturer: **"EcoBatt"** by KNAUF INSULATION**.**
1. Approved Substitutions: Subject to compliance with requirements, products of the following manufacturers may be incorporated into the Work:
a. CertainTeed Corporation.
b. Johns Manville.
c. Owens Corning.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with the requirements of this Section.

B. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION - GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF ACOUSTICAL INSULATION

A. Walls: Install unfaced glass-fiber blanket insulation in sound rated walls.

B. Ceilings: Where glass-fiber blankets are indicated for sound attenuation above ceilings, install unfaced glass-fiber blanket insulation over entire ceiling area in thickness indicated. Extend insulation 48 inches on either side of partition, unless otherwise indicated on Drawings.

3.4 PROTECTION

A. Protect installed insulation 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

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Surface preparation, painting, and finishing of exposed interior items and surfaces.
   a. Surface preparation, priming, and finish coats specified in this Section are in addition to shop-priming and surface treatment specified under other Sections.
2. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.
3. Painting is not required on prefinished items, some finished metal surfaces, concealed surfaces, operating parts, and labels.
   a. Prefinished items not to be painted include the following factory-finished components:
      1) Plastic-laminate clad casework.
      2) Acoustical ceiling panels.
      3) Prefinished metal flashing and trim.
      4) Finished mechanical and electrical equipment.
      5) Light fixtures.
      6) Distribution cabinets.
   b. Concealed surfaces not to be painted include wall or ceiling surfaces in the following generally inaccessible areas:
      1) Furred areas.
      2) Ceiling plenums.
   c. Finished metal surfaces not to be painted include:
      1) Anodized aluminum.
      2) Stainless steel.
      3) Chromium plate.
   d. Operating parts not to be painted include moving parts of operating equipment, such as the following:
      1) Valve and damper operators.
      2) Linkages.
      3) Sensing devices.
      4) Motor and fan shafts.
   e. Items concealed from view, not to be painted include:
      1) Conduit.
      2) Ductwork.
      3) Piping not scheduled to be color-coded.
   f. Labels: Do not paint over Underwriters Laboratories, Factory Mutual or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

B. Related Sections:
1. Section 05 50 00 - Metal Fabrications: Shop-priming ferrous metal.
2. Section 08 12 13 - Hollow Metal Frames: Shop-priming steel doors and frames.

1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

1.3 ACTION SUBMITTALS

A. Product data for each paint system specified, including block fillers and primers.
1. Provide the manufacturer's technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.
2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer's catalog number and general classification.
3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. 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.
1. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
2. Provide a list of material and application for each coat of each sample. Label each sample as to location and application.
3. Submit samples on the following substrates for the Architect's review of color and texture only:
a. Painted Wood: Provide two 12-inch-square samples of each color and material on hardboard.
b. Ferrous Metal: Provide two 4-inch-square samples of flat metal and two 8-inch-long samples of solid metal for each color and finish.

1.4 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. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator that has completed painting system applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.

B. Single-Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats.

C. Field Samples: On wall surfaces and other exterior and interior components, duplicate finishes of prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface until required sheen, color, and texture are obtained; simulate finished lighting conditions for review of in-place work.
   1. Final acceptance of colors will be from job-applied samples.
   2. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
      a. Apply coatings in this room or surface according to the schedule or as specified.
      b. After finishes are accepted, this room or surface will be used to evaluate coating systems of a similar nature.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
   1. All cans must have labels while on site.
   2. Product name or title of material.
   3. Product description (generic classification or binder type).
   4. Manufacturer's stock number and date of manufacture.
   5. Contents by volume, for pigment and vehicle constituents.
   6. Thinning instructions.
   7. Application instructions.
   8. Color name and number.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
   1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.7 FIELD CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 deg F and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 deg F and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
   1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application & drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Paint Manufacturers/Products: Basis-of-Design paint products/manufacturers are listed in the Exterior and Interior Paint Schedules at the end of this Section. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
   1. Sherwin-Williams Company (Sherwin Williams).

2. Benjamin Moore & Co. (Benjamin Moore).
3. PPG Industries, Inc. (Pittsburgh Paints).

2.2 PAINT MATERIALS

A. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by the manufacturer based on testing and field experience.

B. Material Quality: Provide the manufacturer's best-quality trade sale paint material of the various coating types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable.
1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish the manufacturer's material data and certificates of performance for proposed substitutions.

C. Colors: Match colors indicated on the Finish Schedules.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with paint application requirements. Surfaces receiving paint must be thoroughly dry before paint is applied.
1. Do not begin to apply paint until unsatisfactory conditions have been corrected.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Remove these items, if necessary, to completely paint the items and adjacent surfaces.
1. After completing painting operations in each space or area, have items reinstalled by workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.
1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.
2. Cementitious Materials: 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.
3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, 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 applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
   b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
   c. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
4. Ferrous Metals: Clean ungalvanized 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 recommendations of the Steel Structures Painting Council (SSPC).
   a. Clean steel surfaces as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 6.
   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 nonpetroleum-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.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written directions.
   1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
   2. Stir material before application to produce a mixture of uniform density; stir as required during application. 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.

E. Tinting: Tint each 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, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   1. Paint colors, surface treatments, and finishes are indicated in the schedules.
   2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   3. Provide finish coats that are compatible with primers used.
   4. The term “exposed surfaces” includes areas visible when permanent or built-in fixtures, convector 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. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

5. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
6. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
7. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
8. Sand lightly between each succeeding enamel or varnish coat.

C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to the manufacturer's directions.

1. Brushes: Use brushes best suited for the material applied.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

E. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying 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.

3.5 PROTECTION

A. Protect work of other trades, whether being 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 to protect their work after completing painting operations.
1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINT SCHEDULE

A. CMU (Bare, no coatings on surface):
1. Surface Preparation: Allow concrete/mortar to cure for 14 days. Level protrusions and mortar splatter. Substrates shall be clean, dry and free of oil, grease and other contaminants.
2. Block Filler: **SW Loxon Block Surfacer, A24W200 Series**, <100g/L VOC
3. 1st Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC
4. 2nd Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC

B. Concrete (Bare, no coatings on surface):
1. Surface Preparation: Allow concrete/mortar to cure for 14 days. Level protrusions and mortar splatter. Substrates shall be clean, dry and free of oil, grease and other contaminants.
2. Primer: **SW Loxon Concrete & Masonry Primer, A24W8300 Series**, <100g/L VOC
3. 1st Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC
4. 2nd Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC

C. **Ferrous Metal:** (Primer not required on shop-primed items):
1. Primer (If required): **SW Pro Industrial Pro-Cryl Universal Metal Primer, B66-310,** <100g/L VOC
2. 1st Coat: **SW Pro Industrial High Performance Acrylic Semi-Gloss, B66-650,** <50g/L VOC
3. 2nd Coat: **SW Pro Industrial High Performance Acrylic Semi-Gloss, B66-650,** <50g/L VOC

D. Galvanized / Non-Ferrous Metal: (Primer not required on shop-primed items):
1. Primer (If required): **SW Pro Industrial Pro-Cryl Universal Metal Primer, B66-310,** <100g/L VOC
2. 1st Coat: **SW Pro Industrial High Performance Acrylic Semi-Gloss, B66-650,** <50g/L VOC
3. 2nd Coat: **SW Pro Industrial High Performance Acrylic Semi-Gloss, B66-650,** <50g/L VOC

E. **Wood:** (On previously painted substrates, primer can usually be eliminated; except prime all areas where loose or peeling paint is evident)
1. Primer (If required) **SW Exterior Latex Wood Primer, B42W8041**, <100g/L VOC
2. 1st Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC
3. 2nd Coat: **SW A100 Exterior Latex Satin, A82 Series**, <50g/L VOC

3.7 INTERIOR PAINT SCHEDULE

A. Sealed Concrete Floors:
1. Breathable Sealer:
   a. Topcoat: **H&C Paver Sealer - Natural Look Water-Based**, 134 g/L VOC

B. Gypsum Board Ceilings:
1. Primer: **SW ProMar 200 Zero VOC Interior Latex Primer B28W2600,** 0 g/L VOC
2. 1st Coat: **SW ProMar 200 Zero VOC Flat, B30-2600 Series**, 0 g/L VOC
3. 2nd Coat: **SW ProMar 200 Zero VOC Flat, B30-2600 Series**, 0 g/L VOC

C. Gypsum Board Walls:
1. Primer: **SW ProMar 200 Zero VOC Interior Latex Primer B28W2600,** 0 g/L VOC
2. 1st Coat: **SW ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W2650 Series**, 0 g/L VOC
3. 2nd Coat: **SW ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W2650 Series**, 0 g/L VOC

D. Gypsum Board Walls (Moisture prone areas):
1. Primer: **SW ProMar 200 Zero VOC Interior Latex Primer B28W2600,** 0 g/L VOC
2. 1st Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC
3. 2nd Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC

E. **Ferrous Metal (Doors, Frames & Miscellaneous Metals):** (Primer not required on shop-primed items):
1. Primer (If required): **SW Pro Industrial Pro-Cryl Universal Metal Primer, B66-310,** <100g/L VOC
2. 1st Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC
3. 2nd Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC

F. Non-Ferrous / Galvanized Metal:
1. Primer (If required): **SW Pro Industrial Pro-Cryl Universal Metal Primer, B66-310,** <100g/L VOC
2. 1st Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC
3. 2nd Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC

G. Smooth Wood:
1. Primer: **SW ProMar 200 Zero VOC Interior Latex Primer B28W2600,** 0 g/L VOC
2. 1st Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC
3. 2nd Coat: **SW Pro Industrial Pre-Catalyzed Water-Based Epoxy Semi-Gloss, K46 Series,** <150 g/L VOC

H. Stained Wood:
1. Stain-Varnish Finish: Two finish coats of varnish over a sealer coat and interior wood stain. Wipe wood filler before applying stain.
   a. Stain Coat: **SW Wood Classics Stain, A49W800 Series**, 250 g/L VOC
   b. 2nd Coat: **SW Wood Classics WB Satin Polyurethane A68,** <350 g/L VOC

c. 3rd Coat: **SW Wood Classics WB Satin Polyurethane A68,** <350 g/L VOC

I. Plywood Backboards:

1. **"FLAME CONTROL COATINGS No. 20-20A Water Based Flat Latex Intumescent Fire Retardant Coating"**
   a. Topcoat: On surfaces requiring maximum washability and cleanability, No. 20-20A shall be topcoated with **"FLAME CONTROL COATINGS No. 40-40A Low-Gloss Latex Fire Resistant Coating"**

J. Exposed Ceiling (structure and utilities):

1. **Dryfall Paint**
   a. Primer: **SW recommended primer for various substrates encountered.**
   b. 1st Coat: **SW Alkyd Dry Fall Flat**
   c. 2nd Coat (if required): **SW Alkyd Dry Fall Flat**

END OF SECTION

SECTION 09 97 26

CEMENTITIOUS COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and application of cementitious coating systems on the following substrates:
   1. Exterior concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: In each color and gloss of topcoat.
   1. Submit Samples on rigid backing, not less than 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each cementitious coating, from manufacturer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency or performed by a qualified testing agency, for each product formulation.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are from same production run (batch mix) as materials applied and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional 5 percent of each color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of coating system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one **actual substrate of each type** to represent surfaces and conditions for application of coating.
      a. Wall Surfaces: Prepare Samples of at least **50 sq. ft.**
   2. Apply mockups after permanent lighting and other environmental services have been activated.
   3. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, new, unopened packages and containers bearing manufacturer's name and label, and the following information:
   1. Product name or title of material.
   2. Manufacturer's stock number and date of manufacture.
   3. Contents by volume, for pigment and vehicle constituents.
   4. Application instructions.
   5. Color name and number.
   6. Handling instructions and precautions.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage of coatings in a clean condition, free of foreign materials and residue.
   1. Protect cementitious coating materials from freezing. Keep materials dry and storage area neat and orderly. Remove waste daily. Take necessary measures to ensure that workers and work areas are protected from health hazards resulting from handling, mixing, and applying the coating.

1.8 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Sika “Masterseal 581.”

B. Euclid Chemical “Tamoseal.”

C. Other Substitutions: In accordance with “Section 01 25 13 - Product Substitution Procedures.”

D. Products: Subject to compliance with requirements, provide one of the products listed in the Cementitious Coating Schedule for the paint category indicated.

E. Source Limitations: Obtain cementitious coating materials from single source and from single manufacturer.

2.2 CEMENTITIOUS COATINGS

A. Polymer-Modified Cementitious Coating: Containing Portland cement, polymer, and hydrated lime or aggregates.
   1. Compressive Strength: Not less than 4500 psi at 28 days according to ASTM C109/C109M.
   2. Tensile Strength: Not less than 390 psi at 28 days according to ASTM C190.
   3. Flexural Strength: Not less than 800 psi at 28 days according to ASTM C348
   4. Adhesion: test by tensile bond at 28 days not less than 2.5 MPa .
   5. Water Vapor Permeance: Not more than 12 perms per ASTM E96.
   6. Water Absorption: Not more than 4.4% after 24 hour soak; 3.9% after 5 hour boil per ASTM C67.
   7. Accelerated Weathering: No cracking, crazing, loss of adhesion, checking or other defect after 6000 hours per ASTM G96.
   8. UV Resistance: <Insert value and test method>.

B. Color: White.

C. Other Materials: Provide crack fillers, block fillers, and related materials that are compatible with cementitious finish-coat materials and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
   1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for mixing and preparing materials and as applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.
   1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, incompatible coatings, and loose substrate materials.

D. Cementitious and Masonry Surfaces: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Crack Repair: Fill cracks according to manufacturer's written instructions before coating surfaces.
   1. Cracks Larger Than 1/32 Inch: Cut out static cracks, voids, or honeycombing larger than 1/32 inch and patch with materials recommended in writing by coating manufacturer. Identify dynamic cracks and treat according to manufacturer's written instructions before beginning application.

3.3 APPLICATION

A. Apply coatings according to manufacturer's written instructions. Use applicators and techniques suited for coating and substrate indicated.
   1. Dampen substrate of surfaces to receive cementitious coatings one hour before beginning application to prevent surface drag. Immediately before applying coatings, redampen substrate. Substrates shall be saturated and surface dry at time of application.
   2. Brushes: Use Tampico or masonry brushes best suited for material being applied.
   3. Spray Equipment: Use spray equipment recommended in writing by manufacturer for material and texture required.

B. Apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:
   1. First Coat: Apply polymer-modified cementitious coating material at the rate of 2 lb/sq. yd. to achieve a total cured thickness of 25 mils.
   2. Second Coat: Apply polymer-modified cementitious coating material at the rate of 1 lb/sq. yd. to achieve a total cured thickness of 15 mils.
   3. Apply additional coats when undercoats or other conditions show through final coat until cured film is of uniform coating finish, color, and appearance.

C. On previously coated surfaces, apply coating to achieve material thickness as recommended in writing by manufacturer, but not less than the following:
   1. Apply polymer-modified cementitious coating material at the rate of 1 lb/sq. yd. to achieve a total cured thickness of 15 mils.
   2. Apply additional coats when undercoats or other conditions show through final coat until cured film is of uniform coating finish, color, and appearance.

D. Brush Application: Brush out and work brush coats into surfaces in an even film, filling all pores and voids at rate recommended in writing by manufacturer to achieve cured material thickness indicated. Finish coat with smooth, horizontal strokes.

E. Spray Application: Apply each coat according to manufacturer's written instructions to provide the equivalent hiding of brush-applied coats. Follow spray application with a general light brooming of coated surface to impart a slight texture.

3.4 FIELD QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when coating operations are being conducted:
   1. Owner will engage the services of a qualified testing agency to sample coating materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
   2. Testing agency will perform tests for compliance with product requirements specified.
   3. Owner may direct Contractor to stop coating application if test results show materials being used do not comply with requirements. Contractor shall remove noncomplying materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 CEMENTITIOUS COATING SCHEDULE

A. Above-Grade Concrete and Masonry:
   1. Polymer-Modified Cementitious Coating:
      a. Prime Coat: As recommended in writing by topcoat manufacturer.
      b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
      c. Topcoat: Polymer-modified cementitious coating.

END OF SECTION 09 97 26

SECTION 10 14 23

CODE REQUIRED SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Design/build performance specification for code required signage.

B. Related Sections:
1. Section 01 50 00 - Temporary Facilities and Controls: Temporary project identification signs.
2. Section 09 29 00 - Gypsum Board.
3. Division 23 – HVAC: Labels, tags, and nameplates for mechanical equipment.
4. Division 26 – Electrical: Labels, tags, and nameplates for electrical equipment; exit signs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
1. Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.
2. Message list for each sign, including large-scale details of wording, lettering, and Braille layout.

C. Samples: Full-size samples for each sign type.

D. Color Charts: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.

E. Installation: Submit supplier's installation instructions.

1.3 CLOSEOUT SUBMITTALS

A. Closeout Submittals:
1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA) and with code provisions as adopted by authorities having jurisdiction.

B. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance, and sufficient production capacity to produce sign units required without causing delay in the Work.

C. Single-Source Responsibility: For each separate sign type required, obtain signs from one source of a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.

D. Handle products in accordance with manufacturer's instructions.

E. Sign supplier shall provide reorder manual to Owner upon completion. Reorder manual shall include order forms, sign drawings, copy list and location drawings

1.6 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

1.7 COORDINATION

A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs.
   1. For signs supported by or anchored to permanent construction, furnish templates for installation of anchorage devices.

PART 2 - PRODUCTS

2.1 INTERIOR SIGNAGE

A. Code Required Signage: Signage shall comply with the requirements of NFPA 241, International Building Code, NFPA 101 Life Safety Code, and NFPA 20 - Fire Pumps. Signage shall include, but is not limited to:
   1. ADA required signage for public toilet rooms and any other location required by building official.
   2. Exit path signs at exit stair entrances, elevators and any other locations required by fire marshal.
   3. Posting occupant load in assembly spaces.
   4. Identifying delayed egress locks and other security features located within means of egress.

B. Sign Construction: Sign shall be construction of 1/8" thick acrylic, and laminated with 1/16" thick matte finish (non-glare) acrylic.
   1. Sizes: Minimum 6” x 6”, or sizes as required to accommodate required text.

2.2 FABRICATION

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.

C. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

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 work.

B. Verify that items, including anchor inserts, provided under other sections of Work are sized and located to accommodate signs.

C. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.

D. Proceeding with installation implies installer’s acceptance of substrate and conditions.

3.2 INSTALLATION

A. Install product in accordance with supplier’s instructions.

B. Signs shall be installed plumb and level on the wall with a minimum of two (2) ¾” strips of foam tape, adjacent to the latch side of the door, 2" from edge of door trim, at a height of 60" above the finished floor, to the centerline of the sign.
1. Where no wall space is available on the latch side, including double-leaf doors, sign shall be placed on the nearest adjacent wall.

C. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

D. Tolerances: Install signs within the following tolerances and in accordance with manufacturer's recommendations:
1. Interior Signs: Within ¼” vertically and horizontally of intended location.

3.3 CLEANING, PROTECTION, AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

C. Remove construction debris from project in accordance with provisions in Division 01.

D. Protect signs from damage until acceptance by Owner.

END OF SECTION

SECTION 10 21 13

SOLID PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet Enclosures: Solid, high-density polyethylene (HDPE); ceiling hung.
   2. Urinal Screens: Solid, high-density polyethylene (HDPE); wall mounted.

B. Related Sections:
   1. Section 05 50 00 - Metal Fabrications: Supports that attach ceiling-hung units to the overhead structural system.
   2. Section 06 10 00 - Rough Carpentry: Wood blocking.
   3. Section 09 30 00 - Tiling: Wall substrates.
   4. Section 10 28 00 - Toilet Accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For toilet compartments, include plans, elevations, sections, details, and attachments to other work.
   1. Show locations of cutouts for compartment-mounted toilet accessories.
   2. Show locations of reinforcements for compartment-mounted grab bars.
   3. Show locations of centerlines of toilet fixtures.
   4. Show ceiling material and overhead support or bracing locations.

C. Samples: For the following products, in manufacturer's standard sizes unless otherwise indicated:
   1. Solid Plastic Panels: Each type of material, color, and finish required for units, prepared on 6-inch-square samples of same thickness and material indicated for Work.
   2. Hardware: Each type of hardware and fastener.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of toilet compartment, from manufacturer.

B. Warranty: Sample of manufacturer’s warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid plastic panels to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Comply with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, 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.

C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent physical damage or wetting.

C. Handle so as to prevent damage to finished surfaces

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

A. Manufacturer’s Warranties:
   1. Furnish ten (10) year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.
   2. Furnish one-year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

PART 2 - PRODUCTS

2.1 SOLID PLASTIC UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Accurate Partitions Corporation.
   2. Ampco, Inc.
   3. Bobrick Washroom Equipment, Inc.
   4. Bradley Corporation; Mills Partitions.
   5. Comtec Industries/Capitol Partitions.
   6. General Partitions Mfg. Corp.
   7. Global Steel Products Corp.
   8. Hadrian Manufacturing Inc.
   9. Knickerbocker Partition Corporation.

10. Metpar Corp.
11. Partition Systems Incorporated of South Carolina.
12. Rockville Partitions Incorporated.
13. Santana Products, Inc.
14. Sanymetal; a Crane Plumbing company.
15. Weis-Robart Partitions, Inc.

B. Toilet-Enclosure Style: Ceiling hung.

C. Urinal-Screen Style: Wall mounted.

D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-polymer components to prevent burning.
3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

E. Pilaster Shoes and Sleeves (Caps): Stainless steel, ASTM A 666, Type 304.

F. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

2.2 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. All hardware shall be 18-8, type-304 stainless steel with satin-finish.
2. All hardware shall be concealed inside compartments with the exception of outswing doors.
3. Hardware of chrome-plated “Zamak” is unacceptable.
4. Hinges: Manufacturer's standard integral hinge for solid-polymer doors.
5. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
6. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
7. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
8. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Anchorages and Fasteners: Manufacturer's standard exposed and concealed fasteners of stainless steel with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel or hot-dip galvanized steel.

2.3 FABRICATION

A. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support above finished ceiling. Provide assemblies

that support pilasters from structure without transmitting load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage.

B. Doors: Unless otherwise indicated, provide 24-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 INSPECTION

A. Check areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.

B. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.

C. Do not begin installation of compartments until conditions are satisfactory.

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.
   1. Maximum Clearances:
      a. Pilasters and Panels: 1/2 inch.
      b. Panels and Walls: 1 inch.

B. Ceiling-Hung Units: Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

D. Conceal evidence of drilling, cutting, and fitting to room finish.

3.3 ADJUSTING AND CLEANING

A. Adjust hardware for proper operation after installation.

B. Set hinge cam on inswinging doors to hold doors open when unlatched.

C. Set hinge cam on outswinging doors to hold unlatched doors in closed position.

D. Clean exposed surfaces of compartments, hardware, and fittings.

END OF SECTION

SECTION 10 26 13

CORNER GUARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface-mounted, stainless steel corner guards.

B. Related Sections:
1. Section 04 20 00 - Unit Masonry.
2. Section 09 29 00 - Gypsum Board.

1.2 ACTION SUBMITTALS

A. Product Data: Manufacturer's printed product data for each type of corner guard indicated.

B. Manufacturer's Installation Instruction: Printed installation instructions for each corner guar

C. Detail Drawings: Mounting details with the appropriate adhesives for specific project substrates.

D. Samples: Verification samples of corner guard, 8" long, in full size profiles of each type and color indicated

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain corner guards through one source from a single manufacturer.

C. Mockups: Build mockups of corner guards to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for installation.
1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Corner-Guard Covers: Furnish not less than ten (10) percent of each type, color, and texture of corner guard installed.
2. Mounting and Accessory Components: Furnish amounts proportional to the quantities of extra corner guard materials. Package mounting and accessory components with each extra material.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in unopened factory packaging to the jobsite

B. Inspect materials at delivery to assure that specified products have been received.

C. Store in original packaging in a climate controlled location away from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire Performance Characteristics: Provide UL Classified corner guards conforming with NFPA Class A fire rating. Surface burning characteristics, as determined by UL-723 (ASTM E-84), shall be flame spread of 10 and smoke development of 350 - 450. Provide ULC (Canada) listed corner guards conforming to the requirements of the National Building Code of Canada 2010, Subsection 3.1.13.
   1. Surface burning characteristics, as determined by CAN/ULC-S102.2, shall be:
      a. Flame Spread: 15.
      b. Smoke Developed: 35.

2.2 STAINLESS STEEL CORNER GUARDS

A. Manufacturers:
   1. Basis-of-Design Product/Manufacturer: Corner guards are based on **"Surface Mount Stainless Steel Corner Guard System"** as manufactured by **IPC Door and Wall Protection Systems, InPro Corporation**, PO Box 406 Muskego, WI 53150, 800-222-5556, http://www.inprocorp.com
      a. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Surface-Mounted Stainless Steel Corner Guards:
   1. Material: Fabricate from 304 Stainless Steel, 16 gauge.
   2. Wing Size: 3" x 3".
   3. Radius: 1/8"
   4. Angle: Fabricate with 90-degree turn.
   5. Odd Angles (If applicable): Furnish odd-angled corner guards to suit field conditions.
   6. Height: Full height of wall.
   7. Adhesive: Field-applied heavy-duty adhesive recommended by corner guard manufacturer.
   8. Finishes: No. 4 satin stainless steel finish.

2.3 FABRICATION

A. General: Fabricate wall corner guards to comply with requirements indicated for design, dimensions, detail, finish and member sizes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of work.

B. Complete all finishing operations, including painting, before beginning installation of corner guard system materials.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prior to installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION, GENERAL

A. General: Locate corner guards as indicated on drawings for the appropriate substrate and install in compliance with manufacturer's installation instructions.
   1. Install corner guard level and plumb at the height indicated on the drawings.

3.4 INSTALLATION - STAINLESS STEEL CORNER GUARDS

A. Install corner guard units plumb, level, and true to line without distortions.
   1. Do not use materials with dents, stains, or other defects that might be visible in the finished work.
   2. Surface must be dry, clean and properly sealed.
   3. Provide fasteners, adhesives and other accessories required for a complete installation.
   4. Provide anchoring devices to withstand imposed loads.

B. Adhesive Attachment: Apply a bead of specified adhesive in a zigzag pattern over the back of each wing of the corner guard. Position corner guard on the wall and apply pressure until a tight fit is achieved.

3.5 CLEANING

A. Remove the protective plastic covering from the exposed surface of the corner guards.

B. Immediately after completion of installation, clean corner guards surfaces in accordance with manufacturer's clean-up and maintenance instructions

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Washroom accessories.
   2. Custodial accessories.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry: Blocking for toilet accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:
   1. Construction details and dimensions.
   2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Material and finish descriptions.
   4. Features that will be included for Project.
   5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Use room and product designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Inserts and Anchorages: Furnish accessory manufacturers' standard inserts and anchoring devices that must be built into masonry or other work. Coordinate delivery with other work to avoid delay.

B. Regulatory Requirements: Toilet room accessories shall comply with the Americans with Disability Act (ADA) Accessibility Guidelines.

1.5 COORDINATION

A. Coordination: Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 TOILET ACCESSORIES - MANUFACTURERS

A. Basis-of-Design Products: Toilet accessories are based on products indicated on the Drawings. Subject to compliance with requirements, provide the named product or a comparable product approved by Architect.
1. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

2.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors (if applicable): ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

J. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

2.3 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from single sheet of stock, free of joints.

C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

D. Shop assemble components and package complete with anchors and fittings.

E. Provide steel anchor plates, adapters, and anchor components for installation.

F. Hot dip galvanize exposed and painted ferrous metal and fastening devices.

G. Keys: Provide a minimum of six universal keys for access to toilet and bath accessory units requiring internal access for servicing, resupply, etc.

2.4 FACTORY FINISHING

A. Galvanizing: ANSI/ASTM A123 and A386 to 1.25 oz/sq yd.

B. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

C. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats baked enamel.

D. Chrome/Nickel Plating: ANSI/ASTM B456, Type SC 2, polished finish.

E. Stainless Steel: No. 4 satin luster finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 SCHEDULE OF TOILET ACCESSORIES (Refer to Drawings)

END OF SECTION

SECTION 10 43 13

DEFIBRILLATOR CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Automated external defibrillator cabinets without alarm; fully-recessed; stainless steel; non-fire-rated.

B. Related Sections:
1. Section 06 10 00 - Rough Carpentry: Wood blocking and shims.
2. Section 09 22 16 - Non-Structural Metal Framing.
3. Section 09 29 00 - Gypsum Board.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for defibrillator cabinets.
1. Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples for Initial Selection: For each type of cabinet indicated.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
1. For defibrillator cabinets to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain defibrillator cabinets through one source from a single manufacturer.

B. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

C. Preinstallation Conference: Conduct conference at Project site to review methods and procedures related to defibrillator cabinets.

1.5 COORDINATION

A. Coordinate size of defibrillator cabinets to ensure that Owner-provided defibrillators are accommodated.

B. Coordinate sizes and locations of defibrillator cabinets with wall depths.

PART 2 - PRODUCTS

2.1 DEFIBRILLATOR CABINETS

A. Basis-of-Design Product/Manufacturer: Defibrillator cabinets are based on **"LIFESTART SERIES"** as manufactured by J.L. INDUSTRIES; www.jlindustries.com
   1. Substitutions: In accordance with "Section 01 25 13 - Product Substitution Procedures."

B. Description: Stainless steel construction; furnish without alarm.
   1. Model: **"JL Series #1935"**
   2. Trim Style: Flat trim, stainless steel
   3. Door: #4 stainless steel with manufacturer's standard clear acrylic view window.
   4. Wall Rough Opening - Non-Fire-Rated: 15 ¼"W x 15 ¼"H x 6 ½"D.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed defibrillator cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed defibrillator cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. Install defibrillator cabinets in accordance with manufacturer's instructions.

B. Cabinet Mounting Heights: Install cabinets 48 inches from finished floor to centerline of handle, unless otherwise indicated.

C. Fasten cabinets to structure, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust defibrillator cabinet doors to operate easily without binding.

C. On completion of defibrillator cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace defibrillator cabinets that cannot be restored to factory-finished appearance.

END OF SECTION

SECTION 10 44 00

FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Multipurpose dry chemical portable fire extinguishers.
   2. Cabinets:
      a. Semi-recessed painted steel fire-extinguisher cabinets; non-fire-rated.
      b. Semi-recessed painted steel fire-extinguisher cabinets; fire-rated (If required).
   3. Fire extinguisher brackets.

B. Related Sections:
   1. Section 06 10 00 - Rough Carpentry: Wood blocking and shims.
   2. Section 07 84 00 - Firestopping: Firestopping sealants at fire-rated cabinets.
   3. Section 09 22 16 - Non-Structural Metal Framing.
   4. Section 09 29 00 - Gypsum Board.

1.2 REFERENCES

A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2002.

B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

1.3 PERFORMANCE REQUIREMENTS

A. Conform to NFPA 10.

B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
   1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples for Initial Selection: For each type of fire protection cabinet indicated.

C. Product Schedule: For fire extinguishers and fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. For fire extinguishers to include in maintenance manuals.
2. For fire protection cabinets to include in maintenance manuals. Include test, refill or recharge schedules and re-certification requirements.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and fire extinguisher cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
1. Provide fire extinguishers approved, listed, and labeled by FMG.

D. Preinstallation Conference: Conduct conference at Project site.
1. Review methods and procedures related to fire protection specialties.

1.7 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.
2. Warranty Period: Six (6) years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 PORTABLE FIRE EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type: UL-rated 4-A: 80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
1. Available Manufacturers:
a. Amerex Corporation.
b. Ansul Incorporated; Tyco International Ltd.
c. Badger Fire Protection; a Kidde company.
d. Buckeye Fire Equipment Company.
e. Fire End & Croker Corporation.

f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
g. Larsen's Manufacturing Company.
h. Potter Roemer LLC

2.2 FIRE EXTINGUISHER CABINETS

A. **Non-Fire-Rated, Semi-Recessed Fire Extinguisher Cabinets:**
1. Basis-of-Design Manufacturer: **LARSEN'S MANUFACTURING COMPANY**; www.larsensmfg.com
a. Approved Substitutions: Upon compliance with requirements of this section.
1) Fire End & Croker Corporation.
2) JL Industries, Inc.
3) Kidde Fyrnetics.
4) Modern Metal Products; Div. of Technico.
5) Potter Roemer; Div. of Smith Industries, Inc.
6) Watrous; Div. of American Specialties, Inc.
2. Model: **"Architectural Series 2409-6R**
3. Door: **"Vertical Duo Clear Acrylic Door (Painted steel)"**
4. Rough Opening: 25"H x 10½"W x 4" D.

B. **Fire-Rated, Semi-Recessed Fire Extinguisher Cabinets (If required):**
1. Basis-of-Design Manufacturer: **LARSEN'S MANUFACTURING COMPANY**; www.larsensmfg.com
a. Approved Substitutions: Upon compliance with requirements of this section.
1) Fire End & Croker Corporation.
2) JL Industries, Inc.
3) Kidde Fyrnetics.
4) Modern Metal Products; Div. of Technico.
5) Potter Roemer; Div. of Smith Industries, Inc.
6) Watrous; Div. of American Specialties, Inc.
2. Model: **"Architectural Series FS 2409-6R**
3. Door: "Vertical Duo Clear Acrylic Door (Painted steel)"
4. Rough Opening: 26 1/8"H x 11 5/8"W x 4 7/8" D.

2.3 MOUNTING BRACKETS (If Required)

A. **Fire Extinguisher Mounting Brackets:**
1. Basis-of-Design Manufacturer**: LARSEN'S MANUFACTURING COMPANY**; www.larsensmfg.com
a. Approved Substitutions: Upon compliance with requirements of this section.
1) Amerex Corporation.
2) Ansul Incorporated; Tyco International Ltd.
3) Badger Fire Protection; a Kidde company.
4) Buckeye Fire Equipment Company.
5) Fire End & Croker Corporation.
6) J. L. Industries, Inc.; a division of Activar Construction Products Group.
7) Potter Roemer LLC
2. Model: **Larsen's #546,** plated or red baked-enamel finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. Install in fire protection specialties in accordance with manufacturer's instructions.

B. Fire Extinguishers: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
1. Mounting Bracket Heights: 54 inches above finished floor to top of fire extinguisher.
2. Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

C. Cabinet Mounting Heights: Install cabinets 48 inches from finished floor to centerline of handle.

D. Fasten cabinets to structure, square and plumb.
1. Provide inside latch and lock for break-glass panels.
2. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
3. Fire-Rated Cabinets (If applicable):
   a. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.
   b. Seal through penetrations with firestopping sealant as specified in “Section 07 84 00 - Firestopping.”

E. Identification: Apply decals or vinyl lettering at locations indicated.

F. Place extinguishers and accessories in cabinets.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire extinguisher cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire extinguisher cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire extinguisher cabinets that cannot be restored to factory-finished appearance.

E. Replace fire extinguisher cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 11 31 00

RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Refrigerator.
2. Microwave.
3. Dishwasher.
4. Coffeemaker.

B. Related Sections:
1. Section 06 40 23 - Interior Architectural Woodwork: Custom-made cabinets and tops that receive residential appliances.
2. Division 22 – PLUMBING: Water distribution piping connections to residential appliances.
3. Division 26 – ELECTRICAL: Electrical service and connections to residential appliances.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.

B. Samples: For each exposed finish.

C. Appliance Schedule: Use same designations indicated on Drawings.

D. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Residential Appliances: Comply with NAECA standards.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer of each appliance specified agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.
1. Refrigerator/Freezer: Five-year limited warranty for in-place service on the sealed refrigeration system.
2. Dishwasher: 10-year warranty for in-place service against deterioration of tub and door liner
3. Icemakers: Five-year limited warranty on compressor and condenser.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: The design for each residential appliance is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers:
1. Amana Refrigeration, Inc.
2. Frigidaire Appliance Company.
3. Hotpoint.
4. Kitchen Aid Inc.
5. Maytag Corporation.
6. Whirlpool Corporation.
7. Bosch.

2.2 RESIDENTIAL APPLIANCES

A. Freestanding, Stainless Steel, Counter-Depth, French Door Refrigerator:
1. Basis-of Design Product: **GENERAL ELECTRIC "Model No. GNE27JYMFS,"** Stainless steel finish, 69 7/8" high, 35 ¾" wide, 35 7/8" deep.

B. Microwave Oven: 1.5 cu. ft. Countertop Convection/Microwave Oven.
1. Basis-of Design Product: **GENERAL ELECTRIC "Model No. PES7227SLSS,"** Stainless Steel finish.

C. Dishwasher:
1. Basis-of Design Product: **GENERAL ELECTRIC "Model No. GDT226SSLSS," Stainless Steel";** 32 1/4" high, 23 ¾" wide, 23 ½" deep.

D. Coffemaker:
1. Basis-of Design Product:

2.3 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

2.4 INSTALLATION, GENERAL

A. General: Comply with manufacturer's written instructions.

B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.

C. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

D. Utilities: Refer to Mechanical and Electrical Divisions plumbing and electrical requirements.

2.5 CLEANING AND PROTECTION

A. Test each item of residential appliances to verify proper operation. Make necessary adjustments.

B. Verify that accessories required have been furnished and installed.

C. Remove packing material from residential appliances and leave units in clean condition, ready for operation.

END OF SECTION