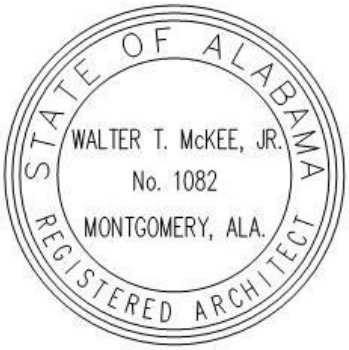
LATHAN · McKEE
ARCHITECTS

Project Manual

New Baseball and Softball Dressing Rooms For Saraland High School for the Saraland City Schools Saraland, Alabama

LATHAN MCKEE PROJECT NO. 26-064
DATE 07.13.2026

Alabama Division of Construction Management No. 2026466



631 South Hull Street – Montgomery, Alabama 36104 334-834-9933

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for
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for the
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Saraland, Alabama

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NEW BASEBALL & SOFTBALL DRESSING ROOMS
FOR SARALAND HIGH SCHOOL
FOR THE SARALAND CITY SCHOOL DISTRICT
SARALAND, ALABAMA

MCKEE PROJECT NO. 26-064

Sealed proposals for this project shall be received by Dr. Brent Harrison, Superintendent at 4010 Lil Spartan Dr, Saraland, AL 36571, **until 2:00 PM Central Time, Thursday, July 30, 2026,** and then opened and read aloud.

A Non-Mandatory Pre-Bid Conference will be held on Wednesday, July 22, 2026, at 10:00 AM Central Time on site.

All General Contractors bidding on this project shall be required to visit the site and examine all existing conditions prior to submitting their proposal. Please contact Daniel Clark at 251-586-2449 to arrange visit.

All Bidders shall have general liability and workman's compensation insurance. The project shall be bid excluding taxes. Bids must be submitted on proposal forms furnished by the Architect or copies thereof. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owners judgment, the best interests of the Owner will thereby be promoted.

A certified check or Bid Bond payable to **Saraland City Schools** in an amount not less than five percent (5%) of the amount of the bid, but in no event more than $10,000.00 must accompany the bidder's sealed proposal. Performance and statutory labor and material payment bonds will be required at the signing of the Contract.

All Bidders shall have general liability and workman's compensation insurance. The project shall be bid excluding taxes. Bids must be submitted on proposal forms furnished by the Architect or copies thereof. No bid may be withdrawn after scheduled closing for receipt of bids for a period of ninety (90) days. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owners judgment, the best interests of the Owner will thereby be promoted.

PDFs of the project can be reviewed by going to the Lathan McKee website at www.lathanmckee.com and under "Project Bid List" selecting "Montgomery". The documents may be viewed on-line and printed by General Contractors, Sub-Contractors and Suppliers. Documents published through this procedure are the only documents endorsed by the Architect. The Architect is unable to monitor, confirm and maintain other websites that provide documents. Notices of Addenda being posted will be provided to entities that have *CONFIRMED* bidding for this particular project. The Architect retains ownership and copyrights of the documents. If bidders require printed sets, please submit request to the Architect at mckeeplans@gmail.com. Include your first & last name, company name, address, phone number and the project name and number. Print sets are to be returned in reusable condition within ten days after bid opening.

All RFIs and RFAs regarding the bid documents shall be sent and addressed through emails found on the RFI and RFA forms in the project manual. **NOTE: ONLY THE RFI AND RFA FORMS IN THE PROJECT MANUAL WILL BE ACCEPTED.** The Architect will not accept inquiries via telephone or fax.

Completion Time: See scope of work in Project Manual.

Supervision: Contractor to ensure proper supervision of all work.

Owner: Dr. Brent Harrison, Superintendent, Saraland City Schools, 4010 Lil Spartan Dr, Saraland, AL 36571, Phone: (251) 375-5420

Architect: Lathan McKee Architects, 3500 Eastern Blvd., Suite 300, Montgomery, AL 36116, Phone: (334) 834-9933

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1. BID DOCUMENTS:

The Bid Documents consist of the Advertisement for Bids, these Instructions to Bidders, any supplements to these Instructions to Bidders, the Proposal Form and the Accounting of Sales Tax, and the proposed Contract Documents. The proposed Contract Documents consist of the Construction Contract, the Performance Bond and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), Drawings, Specifications and all addenda issued prior to execution of the Construction Contract. Bid Documents may be obtained or examined as set forth in the Advertisement for Bids.

2. GENERAL CONTRACTOR'S STATE LICENSING REQUIREMENTS:

When the amount bid for a contract exceeds $50,000, the bidder must be licensed by the State Licensing Board for General Contractors and must show the Architect evidence of license before bidding or the bid will not be received by the Architect 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 of 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.

3. QUALIFICATIONS of BIDDERS and PREQUALIFICATION PROCEDURES:

a. Any special qualifications required of general contractors, subcontractors, material suppliers, or fabricators are set forth in the Bid Documents.

b. The Awarding Authority may have elected to prequalify bidders. Parties interested in bidding for this contract are directed to the Advertisement for Bids 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.

c. Release of Bid Documents by the Architect to a prospective bidder will not constitute any determination by the Awarding Authority or Architect that the bidder has been found to be qualified, prequalified, or responsible.

4. PREFERENCE to RESIDENT CONTRACTORS:
(If this project is federally funded in whole or in part, this Article shall not apply.)

a. 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.

b. A nonresident bidder is a contractor which is neither organized and existing under the laws of the State of Alabama, nor 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.

5. EXAMINATION of BID DOCUMENTS and the SITE of the WORK:

Before submitting a bid for the Work, the bidders shall carefully examine the Bid 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. They shall obtain full knowledge 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. The submission of a bid shall constitute a representation by the bidder that the bidder has made such examination and visit and has judged for and satisfied himself or herself 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, and as to the contract requirements involved.

6. EXPLANATIONS and INTERPRETATIONS:

a. Should any bidder observe any ambiguity, discrepancy, omission, or error in the drawings and specifications, or in any other bid document, or be in doubt as to the intention and meaning of these documents, the bidder should immediately report such to the Architect and request clarification.

b. Clarification will be made only by written Addenda sent to all prospective bidders. Neither the Architect nor the Awarding Authority will be responsible in any manner for verbal answers or instructions regarding intent or meaning of the Bid Documents.

c. In the case of inconsistency between drawings and specifications or within either document, a bidder will be deemed to have included in its bid the better quality or greater quantity of the work involved unless the bidder asked for and obtained the Architect's written clarification of the requirements before submission of a bid.

7. SUBSTITUTIONS:

a. The identification of any product, material, system, item of equipment, or service in the Bid Documents by reference to a trade name, manufacturer's name, model number, etc. (hereinafter referred to as "source"), is intended to establish a required standard of performance, design, and quality and is not intended to limit competition unless the provisions of paragraph "d" below apply.

b. When the Bid Documents identify only one or two sources, or three or more sources followed by "or approved equal" or similar wording, the bidder's proposal may be based on a source not identified but considered by the bidder to be equal to the standard of performance, design and quality as specified; however, such substitutions must ultimately be approved by the Architect. If the bidder elects to bid on a substitution without "Pre-bid Approval" as described below, then it will be understood that proof of compliance with specified requirements is the exclusive responsibility of the bidder.

c. When the Bid Documents identify three or more sources and the list of sources is not followed by "or approved equal" or similar wording, the bidder's proposal shall be based upon one of the identified sources, unless the bidder obtains "Pre-bid Approval" of another source as described below. Under these conditions it will be expressly understood that no product, material, system, item of equipment, or service that is not identified in the Bid Documents or granted "Pre-Bid Approval" will be incorporated into the Work unless such substitution is authorized and agreed upon through a Contract Change Order.

d. If the Bid 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 bidder's proposal must be based upon the identified sole source.

e. Procedures for "Pre-bid Approval". If it is desired that a product, material, system, piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect at least ten days prior to the date set for the opening of bids. At the Architect's discretion, this ten day provision may be waived. The application for approval of a proposed source must be accompanied by technical data which the applicant desires to submit in support of the application. The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed source with previous users, evidence of reputation of the source for prompt delivery, evidence of reputation of the source for efficiency in servicing its products, or any other pertinent written information. The application to the Architect for approval of a proposed source must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bid Documents. The burden of proof of the merit of the proposed substitution is upon the proposer. To be approved, a proposed source must also meet or exceed all express requirements of the Bid Documents. Approval, if granted, shall not be effective until published by the Architect in an addendum to the Bid Documents.

8. PREPARATION and DELIVERY of BIDS:

a. DCM Form C-3: Proposal Form:

(1) Bids must be submitted on the Proposal Form as contained in the Bid Documents; only one copy is required to be submitted. A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with the Proposal Form.

(2) All information requested of the bidder on the Proposal Form must be filled in. The form must be completed by typewriter or hand-printed in ink.

(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 written authority to conduct business in the bidder's behalf by signing and/or modifying the bid. Such written authority shall be signed by the bidder (the individual proprietor, or a member of the Partnership, or an officer of the Corporation) and shall be attached to the Proposal Form.

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

b. DCM Form C-3A: Accounting of Sales Tax

A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

c. 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 should not be less than five percent of the contractor's bid, but is not required to be in an amount more than ten thousand dollars.

d. Delivery of Bids:

(1) Bids will be received until the time set, and at the location designated, in the Advertisement for Bids unless notice is given of postponement. Any bid not received prior to the time set for opening bids will be rejected absent extenuating circumstances and such bids shall be rejected in all cases where received after other bids are opened.

(2) 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 identify the Project and the Work bid on, the name of the bidder, and the bidder's current general contractor's state license number.

(3) Bids may be delivered in person, or by mail if ample time is allowed for delivery. When sent by mail, the sealed envelope containing the bid, marked as indicated above, shall be enclosed in another envelope for mailing.

9. WITHDRAWAL or REVISION of BIDS:

a. A bid may be withdrawn prior to the time set for opening of bids, provided a written request, executed by the bidder or the bidder's "authorized representative", is filed with the Architect prior to that time. 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 change in price and date on the outside of the delivery envelope over the signature of the bidder or the bidder's "authorized representative". 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 Architect prior to the time set for opening bids. The Architect will record the instructed revision upon opening the bid. Such written communication may be by facsimile if so stipulated in Supplemental Instructions to Bidders. 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 12 of these Instructions to Bidders, no bid shall be withdrawn, modified, or corrected after the time set for opening bids.

10. OPENING of BIDS:

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

b. A list of all proposed major subcontractors and suppliers will be submitted by Bidders to the Architect at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids. If the list includes a fire alarm contractor and/or fire sprinkler contractor, Bidders will also submit a copy of the fire alarm contractor's and/or fire sprinkler contractor's permits from the State of Alabama Fire Marshal's Office.

11. INCOMPLETE and IRREGULAR BIDS:

A bid that is not accompanied by data required by the Bid Documents, or a bid which is in any way incomplete, may be rejected. Any bid which contains any uninitialed alterations or erasures, or any bid which contains any additions, alternate bids, or conditions not called for, or any other irregularities of any kind, will be subject to rejection.

12. BID ERRORS:

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 Architect 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. A mistake of law, judgment, or opinion shall not constitute a valid ground for withdrawal without forfeiture.

(4) Documentary Evidence: Clear and convincing documentary evidence of the mistake must be presented to the Awarding Authority and the Architect 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 or by the next regular meeting of the Awarding Authority. 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 and (2) bidding on the same project if it is re-bid.

13. 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 participating in such agreement or collusion to be disqualified from submitting further bids to the Awarding Authority on future lettings. (See § 39-2-6, Code of Alabama 1975, 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 rebid.

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 due for labor and material on other contracts in force at the time of letting.

14. CONSIDERATION of BIDS:

a. After the bids are opened and read publicly, the bid prices will be compared and the results of this comparison will be available to the public. Until the final award of the contract, however, the Awarding Authority shall have the right to reject any or all bids, and it shall have the right to waive technical errors and irregularities if, in its judgment, the bidder will not have obtained a competitive advantage and the best interests of the Awarding Authority will be promoted.

b. If the Bid Documents request bids for projects or parts of projects in combination or separately, the Bid Documents must include supplements to, these Instructions to Bidders setting forth applicable bid procedures. Award or awards will be made to the lowest responsible and responsive bidder or bidders in accordance with such bid procedures.

15. DETERMINATION of LOW BIDDER by USE of ALTERNATES:

a. 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.

b. 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.

c. 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.

d. 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.

16. 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.

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 and competitive prices 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.

17. 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 in the best 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 telegram, confirmed facsimile, or letter to the address shown on the Proposal Form at the earliest possible date. Unless other

time frames are stipulated in Supplemental Instructions to Bidders, 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	30 calendar days after the opening of 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 contract has been presented to the contractor for signature (from the Lead Design Professional)
(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 Architect
(4)	Notice To Proceed issued to the contractor along with distribution of the fully executed construction contract to all parties.	15 calendar days after final execution of contract by the Awarding Authority, by various State Agencies if required 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 Supplemental Instructions to Bidders, 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 satisfactory 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 responsible and responsive bidder, but not more than $10,000. If no other bids are received, the full amount of the bid guaranty shall be so 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 no award is made within the specified period, as it may by agreement be extended, all bids will be rejected, and all guaranties returned. If any potentially successful bidder agrees in writing to a stipulated extension in time for consideration of its bid and its bid was guaranteed with a cashier's check, the Awarding Authority may permit the potentially successful bidder to substitute a satisfactory bid bond for the cashier's check.

END of INSTRUCTIONS TO BIDDERS

REQUEST FOR INFORMATION (RFI)

Email this form in its entirety to Project Manager listed below.
The Architect reserves the right not to answer any Request For Information received after **2:00 p.m., Two (2) days prior to the bid date**.

To: Lathan Mckee, Architects

Jacky Barganier, Project Manager

jbarganier@lathanmckee.com
Email

From: _____
Name

_____
Company

_____
Email

Project: _____

Project Number: _____

Request For Information Number: _____

Issue Date: _____

☐ BID PHASE ☐ CONSTRUCTION PHASE

Procedures for "Explanations and Interpretations":

a. Should any bidder observe any ambiguity, discrepancy, omission, or error in the drawings and specifications, or in any other bid document, or be in doubt as to the intention and meaning of these documents, the bidder should immediately report such to the Architect and request clarification.

b. **Clarification will be made only by written Addenda sent to all prospective bidders or can be accessed by going to the McKee web site - mckeeassoc.com and clicking on the tab "Files" to retrieve the Addendums.** Neither the Architect nor the Owner will be responsible in any manner for verbal answers or instructions regarding intent or meaning of the Bid Documents.

c. **In the case of inconsistency between drawings and specifications or within either document, a bidder will be deemed to have included in its bid the better quality or greater quantity of the work involved unless the bidder asked for and obtained the Architect's written clarification of the requirements before submission of a bid.**

REQUEST FOR INFORMATION DESCRIPTION: *(Fully describe the question or type of information requested.)*

REFERENCES/ATTACHEMENTS: *(List specific documents researched when seeking the information requested.)*

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Drawing Sheet Number: _____ Title: _____

Plan: _____ Elevation: _____ Section: _____ Detail: _____

Other:

RECEIVERS REPLY:

Signed by:_____ Date:_____ Copies to:_____

REQUEST FOR APPROVAL (RFA)
PRIOR APPROVAL/SUBSTITUTION REQUEST

Email this form in its entirety to Project Manager listed below.
All products, materials, systems, equipment and services requested for prior approval must be submitted to the architect for approval **no later than 2:00 p.m., Ten (10) days prior to the bid date**.

To: Lathan Mckee, Architects

Jacky Barganier

jbarganier@lathanmckee.com
Email

Substitution Request Number: _____

From: _____

Date: _____

Project: _____

A/E Project Number: _____

Re: _____

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Procedures for "Substitutions" and "Pre-Bid Approval":

a. The identification of any product, material, system, item of equipment, or service in the Bid Documents by reference to a trade name, manufacturer's name, model number, etc. (hereinafter referred to as "source"), is intended to establish a required standard of performance, design, and quality and is not intended to limit competition unless the provisions of paragraph "D" below apply.

b. When the Bid Documents identify only one or two sources, or three or more sources followed by "or approved equal" or similar wording, the bidder's proposal may be based on a source not identified but considered by the bidder to be equal to the standard of performance, design and quality as specified; however, such substitutions must ultimately be approved by the Architect. If the bidder elects to bid on a substitution without "Pre-bid Approval" as described below, then it will be understood that proof of compliance with specified requirements is the exclusive responsibility of the bidder.

c. When the Bid Documents identify three or more sources and the list of sources is not followed by "or approved equal" or similar wording, the bidder's proposal shall be based upon one of the identified sources, unless the bidder obtains "Pre-bid Approval" of another source as described below. Under these conditions it will be expressly understood that no product, material, system, item of equipment, or service that is not identified in the Bid Documents or granted "Pre-Bid Approval" will be incorporated into the Work unless such substitution is authorized and agreed upon through a Contract Change Order.

d. If the Bid 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 bidder's proposal must be based upon the identified sole source.

e. **Procedures for "Pre-Bid Approval".** If it is desired that a product, material, system, piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect **at least ten days prior to the date set for the opening of bids**. At the Architect's discretion, this ten day provision may be waived. **The application for approval of a proposed source must be accompanied by technical data which the applicant desires to submit in support of the application.** The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed source with previous users, evidence of reputation of the source for prompt delivery, evidence of reputation of the source for efficiency in servicing its products, or any other pertinent written information. **The application to the Architect for approval of a proposed source must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bid Documents.**

The burden of proof of the merit of the proposed substitution is upon the proposer. To be approved, a proposed source must also meet or exceed all express requirements of the Bid Documents. Approval, if granted, shall not be effective until published by the Architect in an addendum to the Bid Documents.

The undersigned requests consideration of the following product substitution:

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Supporting Data Attached: ☐ Product Description ☐ Drawings ☐ Photographs ☐ Performance & Test Data ☐ Specifications

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned states and certifies the following: (Mark Boxes as Applicable)

☐ Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.

or

☐ Proposed substitution differs from what is specified in the Bid Documents. Submitted Data clearly identifies all differences from what is specified in the Bid Documents.

☐ No changes will be required to the Contract Documents for the proper installation of the proposed product substitution.

or

☐ Changes will be required to the Contract Documents for the proper installation of the proposed product substitution. Submitted Data clearly identifies description of changes.

and

☐ Warranty will be furnished for proposed substitution ☐ Equal to or ☐ Superior to specified product.

☐ Proposed substitution does not affect dimensions shown on the drawings and functional clearances.

☐ No changes will be required to the building design, engineering design or detailing by the proposed substitution.

☐ Proposed substitution will have no adverse effect on other trades and will not affect or delay construction progress schedule.

☐ No maintenance is required by the proposed substitution other than that required for originally specified product.

☐ Other Information:

The undersigned further states that they have read the corresponding specification sections in the project manual and confirms that the function, appearance and quality of the proposed substitution are equivalent to or superior to the originally specified product.

Submitted by: (Print) Signature: Date:

Firm: Address:

Email: Telephone:

A/E REVIEW AND ACTION

☐ Substitution Approved ☐ Substitution Approved as noted ☐ Substitution Rejected

☐ Substitution Request Received to Late

Comments:

Signed by: Date:

PROPOSAL FORM

To: _____ Date: _____
(Awarding Authority)

In compliance with the Advertisement for Bids and subject to all the conditions thereof, the undersigned

_____
(Legal Name of Bidder)

hereby proposes to furnish all labor and materials and perform all work required for the construction of

WORK _____

_____

in accordance with Drawings and Specifications, dated _____, prepared by

_____, Architect/Engineer.

The Bidder, which is organized and existing under the laws of the State of _____,

having its principal offices in the City of _____,

is: ☐ a Corporation ☐ a Partnership ☐ an Individual ☐ (other) _____.

LISTING OF PARTNERS OR OFFICERS: If Bidder is a Partnership, list all partners and their addresses; if Bidder is a Corporation, list the names, titles, and business addresses of its officers:

_____

_____

_____

BIDDER'S REPRESENTATION: The Bidder declares that it has examined the site of the Work, having become fully informed regarding all pertinent conditions, and that it has examined the Drawings and Specifications (including all Addenda received) for the Work and the other Bid and Contract Documents relative thereto, and that it has satisfied itself relative to the Work to be performed.

ADDENDA: The Bidder acknowledges receipt of Addenda Nos._____ through _____ inclusively.

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

_____ Dollars ($ _____)

ALTERNATES: If alternates as set forth in the Bid Documents are accepted, the following adjustments are to be made to the Base Bid:

For Alternate No. 1 (. . . . .) ☐ (add) ☐ (deduct) $ _____
(Insert key word for Alternate)

For Alternate No. 2 (. . . . .) ☐ (add) ☐ (deduct) $ _____

For Alternate No. 3 (. . . . .) ☐ (add) ☐ (deduct) $ _____

For Alternate No. 4 (. . . . .) ☐ (add) ☐ (deduct) $ _____

For Alternate No. 5 (. . . . .) ☐ (add) ☐ (deduct) $ _____

For Alternate No. 6 (. . . . .) ☐ (add) ☐ (deduct) $ _____

UNIT PRICES - (Attach to this Proposal Form the unit prices, if any, on a separate sheet.)

BID SECURITY: The undersigned agrees to enter into a Construction Contract and furnish the prescribed Performance and Payment Bonds and evidence of insurance within fifteen calendar days, or such other period stated in the Bid Documents, after the contract forms have been presented for signature, provided such presentation is made within 30 calendar days after the opening of bids, or such other period stated in the Bid Documents. As security for this condition, the undersigned further agrees that the funds represented by the Bid Bond (or cashier's check) attached hereto may be called and paid into the account of the Awarding Authority as liquidated damages for failure to so comply.

Attached hereto is a: (*Mark the appropriate box and provide the applicable information.*)

☐ Bid Bond, executed by _____ as Surety,

☐ a cashier's check on the _____ Bank of _____,

for the sum of _____

Dollars ($ _____) made payable to the Awarding Authority.

BIDDER'S ALABAMA LICENSE:

State License for General Contracting: _____
License Number Bid Limit Type(s) of Work

CERTIFICATIONS: The undersigned certifies that he or she is authorized to execute contracts on behalf of the Bidder as legally named, that this proposal is submitted in good faith without fraud or collusion with any other bidder, that the information indicated in this document is true and complete, and that the bid is made in full accord with State law. Notice of acceptance may be sent to the undersigned at the address set forth below.

The Bidder also declares that a list of all proposed major subcontractors and suppliers will be submitted at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids.

Legal Name of Bidder _____

Mailing Address _____

* **By (Legal Signature)** _____

* Name & Title (print) _____ (*Seal*)

Telephone Number _____

Email Address _____

* If other than the individual proprietor, or an above named member of the Partnership, or the above named president, vice-president, or secretary of the Corporation, attach written authority to bind the Bidder. Any modification to a bid shall be over the initials of the person signing the bid, or of an authorized representative.

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

UNIT PRICE ITEM LEGEND

New Baseball and Softball Dressing Rooms

for

Saraland High School

for the

Saraland City Schools

Saraland, Alabama

MCKEE PROJECT NO. 26-064

Legal Name of Bidder _____

Mailing Address _____

The General Contractor shall include the Unit Prices below in their Base Bid Proposal. The quantities assigned below are above and beyond the amounts required to complete the work required by the bid documents. This Unit Price Item Legend shall be submitted with the sealed Proposal.

SCHEDULE OF UNIT PRICES:

UNIT PRICES: The Unit Prices below establishes Unit Prices so that the Owner can delete/add quantities from the Contract(s) required.

UNIT PRICE #1: The Contractor shall include in his Base Bid proposal the cost for [an **Additional**] **100** Cubic Yards Measured In Place (CYMIP) of removal and off-site disposal of unsuitable soil and furnishing, placing and compacting of acceptable fill material from below the finished subgrade and tested to meet requirements specified for the affected area, in accordance with Section 02200 "Earthwork."

100 CYMIP @ _____/CYMIP = **$**_____ **Included in Base Bid**

UNIT PRICE #2: The Contractor shall include in his Base Bid proposal **50** Cubic Yards Measured In Place (CYMIP) for excavation of unsuitable soils, disposal off site of excavated material and furnishing and installation of lean concrete mud footing “mud sill” in accordance with Section 02200 "Earthwork."

50 CYMIP @ _____ per CYMIP = **$**_____ **Included in Base Bid**

Note: This unit price is not applicable to cost of mud footings that are required due to over-excavation, or due to not pouring footings the same date they are excavated, or other reasons indicated in Section 02200 - "Earthwork," or Section 03310 - "Concrete."

ACCOUNTING OF SALES TAX
Attachment to DCM Form C-3: Proposal Form

To: _____ Date: _____
(Awarding Authority)

NAME OF PROJECT _____

_____

SALES TAX ACCOUNTING

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

ESTIMATED SALES TAX AMOUNT

BASE BID: $_____

Alternate No. 1 (……..) ☐(add) ☐(deduct) $_____
(Insert key word for Alternate)

Alternate No. 2 (……..) ☐(add) ☐(deduct) $_____

Alternate No. 3 (……..) ☐(add) ☐(deduct) $_____

Alternate No. 4 (……..) ☐(add) ☐(deduct) $_____

Alternate No. 5 (……..) ☐(add) ☐(deduct) $_____

Alternate No. 6 (……..) ☐(add) ☐(deduct) $_____

Legal Name of Bidder _____

Mailing Address _____

***By (Legal Signature)** _____

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

*Title _____

Telephone Number _____

Email Address _____

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A with DCM Form C-3 is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

BID BOND

The **PRINCIPAL** (*Bidder's company name and address*)
Name:
Address:

The **SURETY** (*Company name and primary place of business*)
Name:
Address:

The **OWNER** (*Entity name and address*)
Name:
Address:

The **PROJECT** for which the Principal's Bid is submitted: (*Project name as it appears in the Bid Documents*)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned Principal and Surety, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the **PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than Ten-thousand Dollars ($10,000.00)**.

THE CONDITION OF THIS OBLIGATION is that the Principal has submitted to the Owner the attached bid, which is incorporated herein by reference, for the Project identified above.

NOW, THEREFORE, if, within the terms of the Bid Documents, the Owner accepts the Principal's bid and the Principal thereafter either:

(a) executes and delivers a Construction Contract with the required Performance and Payment Bonds (each in the form contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or

(b) fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the Owner the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the Owner may award a Construction Contract for the same Work to another bidder,

then, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the Owner may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

SIGNED AND SEALED this _____ day of _____, _____.

ATTEST:

_____

PRINCIPAL:

_____

By _____

_____
Name and Title

SURETY:

ATTEST:

_____

_____

By_____

_____
Name and Title

SPECIAL INSTRUCTIONS TO BIDDERS

1.1 INTENT OF INSTRUCTIONS

A. The Special Instructions to Bidders are intended to amplify the abbreviated Advertisement and to give other details which shall allow interested parties to prepare bids which accurately reflect the scope of the Work. The Special Instructions to Bidders are meant to be viewed as a complement to the general Instructions to Bidders found in the Project Manual. Should any discrepancy or ambiguity be noted, the Special Instructions to Bidders shall defer to the general Instructions to Bidders.

1.2 EXPLANATION AND INTERPRETATION

A. Should any Bidder or subcontractor find any ambiguity, discrepancy, omission, or error in the Drawings and Project Manual, or insufficient information to provide a complete job, or be in doubt as to the intent and meaning thereof, he should at once report such in writing to Architect and request clarification prior to bidding

B. Clarification shall be made only by written Addenda during the bid period and sent to all perspective Bidders. The Architect and Consultants shall not be responsible for verbal answers regarding intent or meaning of the Contract Documents, or for any verbal instructions, by whomsoever made, prior to the award of the Contract.

C. Additionally, all designed systems and/or assemblies are to be proposed and bid as complete assemblies or operational systems. Drawings are indicating intent and not attempting to fully obtain or detail required work.

1.3 BIDDER REQUIREMENTS

A. All Bidders must honor their bid proposals for a period of 90 calendar days from date of bid opening.

B. The Contractor MUST Field Verify all existing conditions prior to submitting bid proposal.

C. The **Apparent Low Bidder *AND* Apparent Second Lowest Bidder** must submit to the **Architect a direct Contact Name, Phone Number and Email Address for the Bonding Company and a list of the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work.** The list of Subcontractors, Suppliers and Fabricators must be received by the Architect within **24 hours following the Bid Opening** (email to: **krawlinson@lathanmckee.com**). Once the successful bidder has obtained approval from the Owner, no changes in Subcontractors, Suppliers or Fabricators shall be made without the express, written consent of the Owner. Contractor shall request consent in writing from the Owner and Architect and provide specific and reasonable explanation as to the necessity of said change. Should said change be approved by the Owner, the Contractor must submit the desired replacement Subcontractor to the Architect and obtain written approval of the Subcontractor.

1.4 OPENING OF PROPOSALS

A. The Owner shall, according to applicable laws and regulations pertaining to bid openings, receive and review all Proposals submitted, according to the method selected below:

1. Proposals shall be opened and read publicly at the time and place indicated in the Advertisement.

2. Proposals may be rejected if they contain any omissions, alterations of forms, additions not called for, conditional bids, alternate bids unless called for, incomplete bids, erasures, or irregularities of any kind. Proposals in which the unit or lump sum prices bid are obviously unbalanced may be rejected. Additions to or deductions from the Bid amount may be written on the outside of the sealed bid, or by letter enclosed in the sealed bid envelope.

1.5 DETERMINATION of LOW BIDDER by USE of ALTERNATES

A. 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.

B. 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.

C. **If additional funds become available after the bid opening, the Owner may at his option elect to award to the lowest base bid bidder a contract based on the Contractors base bid amount and additional Alternates.**

D. 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.

E. 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.

F. 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.

1.6 AWARD OF CONTRACT

A. The Bidder to whom the award is made shall be notified by letter to the address shown on his Proposal at the earliest possible date. At such time, at the option of the Owner, additional information such as a complete financial statement may be required from the successful Bidder.

1.7 EXECUTION OF CONTRACT

A. The Contract shall be signed by the successful Bidder, in the number of counterparts provided in the Contract Agreement and returned to the Owner with satisfactory Contract Bonds within ten (10) days after the date of Notice of Award.

1.8 PERFORMANCE BOND AND PAYMENT BOND

A. The intent of the Performance Bond is to ensure the faithful performance of each and every condition, stipulation, and requirements of the Contract and to indemnify and save harmless the Owner, Architect, and Consultants from any and all damages, either directly or indirectly (arising out of any failure to perform same). The successful Bidder to whom the Contract is awarded shall furnish at his expense an acceptable Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price of the Contract as awarded. Said Bond shall be made on the approved Bond form, shall be furnished by a surety company duly authorized and qualified to make such bonds 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 Owner under the Bond, the direct costs of administration, architectural, engineering, and legal services, shall lie against the Contract Bond for Performance of the Work.

B. In addition thereto, the successful Bidder to whom the Contract is awarded shall furnish at his expense a Payment Bond with good and sufficient surety payable to the Owner in an amount not less than one hundred percent (100%) of the Contract Price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, material, feedstuffs, or supplies for or in prosecution of the Work provided for in the Contract and for the payment or reasonable attorneys' fees, incurred by successful claimants or plaintiffs in suits on said Bond.

C. The **Apparent Low Bidder *AND* Apparent Second Lowest Bidder** must submit to the **Architect a direct Contact Name, Phone Number and Email Address for the Bonding Company** within 24 hours of the bid opening.

1.9 APPROVAL OF CONTRACT

A. No Contract is binding upon the Owner until it has been executed by the Owner and the successful Bidder and copies delivered.

1.10 CAD FILES

A. McKee & Associates CAD Files shall not be provided. Should the contractor require CAD Files they are encouraged to seek online PDF to CAD File Conversion vendors and/or software.

1.11 LIST OF SUBCONTRACTORS

A. The **Apparent Low Bidder *AND* Apparent Second Lowest Bidder** must submit to the Architect **a direct Contact Name, Phone Number and Email Address for the Bonding Company and a list of the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work** must be received by the Architect within twenty-four hours following the Bid Opening. Email to **krawlinson@lathanmckee.com.** Once the successful bidder has obtained approval from the Owner, no changes in Subcontractors, suppliers and fabricators shall be made without the express, written consent of the Owner.

1.12 LIST OF SUBCONTRACTORS SUBMITTAL FORM

Email this form in its entirety to contact listed below.

The **Apparent Low Bidder *AND* Apparent Second Lowest Bidder** must submit to the Architect **a direct Contact Name, Phone Number and Email Address for the Bonding Company and** the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work. The list of Subcontractors must be received by the Architect within twenty-four hours following the Bid Opening.

To: Lathan Mckee, Architects

Kayla Rawlinson

krawlinson@lathanmckee.com
Email

From: _____
Company

_____
Name

_____
Email

_____
Phone Number

Project Name: _____

Project Number: _____ Issue Date: _____

Bid Date: _____

Category of Work	Name of Sub to Perform Work	Name of Supplier
SURETY		

END OF SECTION

PREPARATION AND APPROVAL OF
CONSTRUCTION
CONTRACTS* and *BONDS
SUBMITTED ELECTRONICALLY

CHECKLIST

Use with DCM Forms C-5, C-6, & C-7
and DCM Forms 9-A, 9-B, & 9-C

CONSTRUCTION CONTRACT - DCM Form C-5 or DCM Form 9-A (PSCA Projects) The numbers in the left column below correspond to numbers in the left margin of the Contract form.	
(1)	**PROJECT NUMBER(S):** DCM will insert the DCM Project Number in the field provided. • On DCM Form 9-A, insert the PSCA Project Number in the field provided.
(2)	**DATE:** Do not select a date beyond today's date.
(3)	**OWNER:** Insert the full, legal name, address, email, and telephone number of the Owner (Awarding Authority). • On DCM Form 9-A, insert the name, address, email, and telephone number of the Local Owner (city or county school board, college, university, etc.) after "Alabama Public School and College Authority"
(4)	**CONTRACTOR:** Insert the Contractor's company name, correct mailing address, email, and telephone number. For State Agency projects, the Contractor Company name and address must match the name and address registered in the State of Alabama Accounting and Resource System (STAARS) or AL Buys (if registered), used by most State Agencies to pay Vendors. The Contractor Company name and address must be consistent across all documents in the same contract package, in order to avoid Comptroller's Office rejection. • On DCM Form 9-A: The Contractor Company name and address must match the name and address registered in STAARS or AL Buys used by the State to pay Vendors. The Contractor Company name and address must be consistent across all documents in the same contract package, in order to avoid Comptroler's rejection.
(5)	**The WORK:** Insert the complete name of the Project; same as in the Bid Documents.
(6)	**CONTRACT DOCUMENTS**: Insert the date of the Bid Documents
(7)	**ADDENDA:** Identify, by number and date, all pre-bid Addenda that were issued to the Bid Documents. If none were issued, insert "None". All Addenda shall be submitted to DCM for review prior to contract issuance.
(8)	**ARCHITECT:** Insert the full, legal name, address, email, and telephone number of the Project Architectural or Engineering firm.
(9)	**CONTRACT SUM:** The Contract Sum is the total of the Contract's Base Bid and accepted Bid Alternate Prices, if any. Insert the Contract Sum in words and figures, verifying that this amount corresponds with the CERTIFIED TABULATION OF BIDS.
(10)	**BID ALTERNATE PRICES**: Identify which, if any, Bid Alternate Prices are accepted and included in the Contract Sum by inserting either (a) "No Alternate Prices Requested in Bid", (b) "No Alternate Prices Accepted", or (c) a listing of the accepted Alternates by number and dollar amount.
(11)	**The CONTRACT TIME:** State the Contract Time in words and in figures.
(12)	**LIQUIDATED DAMAGES:** If the Owner has computed a daily rate for liquidated damages, insert the amount in both words and figures in the spaces provided.
(13)	**SPECIAL PROVISIONS:** This space may be used to incorporate Special Provisions into the Contract, such as unit prices, compliance with enacted provisions, and value engineering. If the solicitation for bids required Unit Prices, insert a statement of which Unit Prices, if any, are accepted and incorporated into the Contract. If more space is needed, Special Provisions may be stated on an attachment that is cited in the Special Provisions section. • DCM Form 9-A is published bearing Special Provision **"A. Severable Payments"**, which is where the portions of the Contract Sum to be paid by the PSCA and the Local Owner are to be stated. Obtain these amounts from Local Owner and insert them in the spaces provided. Other Special Provisions, such as disposition of Unit Prices, may be inserted below this provision.
(14)	**STATE GENERAL CONTRACTOR'S LICENSE:** Insert the Contractor's current state general contracting license number, bid limit, and classification in the spaces provided.

(15)	**SIGNATURES - APPROVING and CONTRACTING PARTIES** The documents will forward to the signers in sequential order.

PERFORMANCE BOND, DCM Form C-6 or DCM Form 9-B (PSCA Projects), and
PAYMENT BOND, DCM Form C-7 or DCM Form 9-C (PSCA Projects)

Required for contracts of $100,000.0 or more, with surety's power-of-attorney - required per Section 39-2-8 of the Code of Alabama.

(1)	**SURETY'S BOND NUMBER** should be inserted in the field provided.
(2)	**PRINCIPAL:** Contractor's name and address is to be the same as appears in the Construction Contract.
(3)	**SURETY:** The full, legal name and address of the bonding company.
(4)	**OWNER:** The Owner's name and address is to be the same as appears in the Construction Contract.
(5)	**PENAL SUM:** The Penal Sum of each Bond is to be the Contract Sum of the Construction Contract and is to be inserted in both words and figures.
(6)	The **Date** of the Construction Contract**:** The date that appears on the Construction Contract.
(7)	The **PROJECT:** The same name or description as appears in the Construction Contract.
(8)	**DATE:** After "SIGNED AND SEALED" is to appear the date upon which Surety signs the Bond. **THIS DATE CANNOT PRECEDE THE DATE OF THE CONSTRUCTION CONTRACT.**
(9)	**CONTRACTOR'S SIGNATURE:** The Contractor's name must appear beneath "CONTRACTOR", under which the signature of a member or officer of the firm must appear with the name and title of the signing party appearing beneath the signature.
(10)	**SURETY'S SIGNATURE:** The full, legal name of the bonding company must appear under "SURETY", under which the signature of an individual having power of attorney for the bonding company must appear with the individual's name and title appearing beneath the signature.
(11)	**ATTACHED POWER OF ATTORNEY:** Attached to each of the Bonds must be a Power of Attorney, signed by an officer of the bonding company, for the individual e-signing the bond on behalf of the bonding company. **The date of the Power of Attorney must not precede the date of the bond.**

ATTACHMENTS

The following documents must be attached to the Construction Contract:

- Insurance Certificate (attach copy): It is the responsibility of the design professional to ensure all insurance requirements are discussed with bidders prior to a bid and that Contractor has provided the requirements to their insurance provider. Contractor must obtain all insurance coverage specified in Article 37 of the General Conditions of the Contract - required per Section 39-2-8 of the Code of Alabama.
- Surety's power-of-attorney: Required for Performance Bond, which is required for contracts of $100,000.00 or more per Section 39-2-8 of the Code of Alabama.
- Surety's power-of-attorney: Required for Payment Bond, which is required for contracts of $100,000.00 or more per Section 39-2-8 of the Code of Alabama.
- Certified Tabulation of Bids (attach copy): Required for all projects including those with informal bids -required per Section 39-2-6 of the Code of Alabama.
- DCM Form C-3: Proposal Form (attach copy): If bid proposal was adjusted by notation on outside of envelope, also attach copy of outside of envelope including notation.
- DCM Form C-3A: Accounting of Sales Tax (attach copy): Attachment must be of the executed C-3A from the bid -required per Section 40-9-14.1 of the Code of Alabama.
- E-Verify Memorandum of Understanding (attach copy): Entire document required - required per Section 31-13-25(b) of the Code of Alabama.
- Alabama Vendor Disclosure Statement - required per Section 41-16-82 of the Code of Alabama. Contractor must mail one original completed wet-signed notarized and dated hardcopy to DCM along with DCM Form: Transmittal of Alabama Vendor Disclosure Statement. DCM will perform a review, and if the document is correct, will attach a scan of the Disclosure Statement to the Contract.

DCM USER FEES:

- **PSCA-Funded Projects & Fully Locally-Funded State Agency Projects:** The Contract Document Administration Fee-CC and the Permit Fee must be paid by the time a Construction Contract for a PSCA-funded project or state agency/authority project is submitted to DCM for review, or when a fully locally-funded project Construction Contract is converted to PSCA. Contract reviews can begin once the fees have been paid.

- **Fully Locally-Funded K-12 Projects:** The Permit Fee must be paid by the time a copy of a fully locally-funded K-12 school project's executed Construction Contract is received at DCM's office from the State Department of Education (SDE). * See Permit Fee exception below.

- **General Information:**

  Basic Contract Document Administration (CDA) Fee: This fee covers review of the Agreement Between Owner and Architect (O/A Agreement) and Construction Contract for state agency projects, and partially or fully PSCA-funded projects of K-12 public schools and universities and the related amendments, change orders, service invoices and pay requests. This fee does not apply to fully locally-funded K-12 public school projects or fully locally-funded university projects. The Basic CDA Fee covers review of the original submitted document and one revision. The total basic CDA fee is 1/2 of 1% of the total construction cost, due in two parts: 1/4 of 1% (.25%) of the Project Budget for administration of the O/ A Agreement. 1/4 of 1% (.25%) of the Construction Contract Amount for administration of the Construction Contract. The CDA Fee for a PSCA-funded O/A Agreement or Construction Contract is limited by the Project Construction Cost funded by PSCA.
  Additional Revised Contract Document Fee: When more than one revision of a Construction Contract is required, an additional fee of $200.00 will be charged to the design professional for each additional submittal until the document is executed.
  Basic Permit Fee: This fee covers required project inspections. The Permit Fee must be paid before a construction contract is reviewed by DCM, or becomes due when a self-performance letter or fully locally-funded K-12 construction contract is received by DCM, and must be paid before a Pre-Construction Conference is scheduled with DCM Inspectors*
  Note: Although DCM does not review the construction contracts of fully locally-funded public K-12 projects, the Permit Fee must be paid before the required Pre-Construction Conference is scheduled with DCM Inspectors for such projects.*

  * Exception: Permit Fees are not owed for fully locally-funded public K-12 projects with an estimated cost of $750,000.00 or Less for capital improvement or alterations, additions, repair, or maintenance of heating, ventilation, and air conditioning systems or any alterations, additions, repair, or maintenance of a roof; all such projects are still subject to DCM pre-construction conferences and inspections.

  ∇ Determination of whether or not a project is in the $750,000.00 or Less classification for Permit Fees is based on the cost of the entire project including all phases and bid packages. If total of bids received for all phases and bid packages exceeds $750,000.00 for a fully locally-funded public K-12 project, then a Permit Fee is owed.

  Fees May Be Paid online at www.dcm.alabama.gov or paid with a physical check. Make check payable to: "Finance - Construction Management", include the DCM (BC) Project #, if assigned, on the check and attach the CDA Fees Calculation Worksheet and/or the Permit Fees Calculation Worksheet (also available on www.dcm.alabama.gov). Mail payment to: Finance - Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150. For payments using Public School and College Authority (PSCA) funds and for state agency inter-fund transfers: contact Jennie Jones at 334-242-4808 or jennie.jones@realproperty.alabama.gov.

This form is provided solely for the purpose of inclusion in the project manual. A Construction Contract for fully locally-funded K-12 projects must be initiated via the appropriate DocuSign link from DCM's Engage Portal at https://engagealabama-rpm.facilityforce.cloud by the Lead Design Professional Firm.

(1) **DCM (BC) Project No.**

CONSTRUCTION CONTRACT

Numbers in margin correspond to "Checklist", DCM Form B-7

(2) This Construction Contract is entered into this day of in the year of

(3) between the **OWNER,**
Entity Name:
Address:
Email & Phone #:

(4) and the **CONTRACTOR,**
Company Name:
Address:
Email & Phone #:

(5) for the **WORK** of the Project, identified as:

(6) The **CONTRACT DOCUMENTS** are dated and have been amended by
(7) **ADDENDA**

(8) The **ARCHITECT** is
Firm Name:
Address:
Email & Phone #:

(9) The **CONTRACT SUM** is
Dollars ($) and is the sum of the Contractor's Base Bid for the Work and the following
(10) **BID ALTERNATE PRICES:**

(11) The **CONTRACT TIME** is ( ) calendar days.

THE OWNER AND THE CONTRACTOR AGREE AS FOLLOWS: The Contract Documents, as defined in the General Conditions of the Contract (DCM Form C-8), are incorporated herein by reference. The Contractor shall perform the Work in accordance with the Contract Documents. The Owner will pay and the Contractor will accept as full compensation for such performance of the Work, the Contract Sum subject to additions and deductions (including liquidated damages) as provided in the Contract Documents. The Work shall commence on a date to be specified in a Notice to Proceed issued by the Owner (or by the Lead Design Professional on the Owner's behalf), and shall then be substantially completed within the Contract Time.

(12) **LIQUIDATED DAMAGES** for which the Contractor and its Surety (if any) shall be liable and may be required to pay the Owner in accordance with the Contract Documents shall be equal to six percent interest per annum on the total Contract Sum unless a dollar amount is stipulated in the following space, in which case liquidated damages shall be determined at _____ dollars ($_____) per calendar day.

Numbers in margin correspond to "Checklist", DCM Form B-7

(13) **SPECIAL PROVISIONS** *(Insert any Special Provisions here, such as acceptance or rejection of unit prices. If Special Provisions are continued in an attachment, identify the attachment below)*:

(14) **STATE GENERAL CONTRACTOR'S LICENSE:** The Contractor does hereby certify that Contractor is currently licensed by the Alabama State Licensing Board for General Contractors and that the certificate for such license bears the following:

License No.:

Classification(s):

Bid Limit:

The Owner and Contractor have entered into this Construction Contract as of the date first written above and have executed this Construction Contract in sufficient counterparts to enable each contracting party to have an originally executed Construction Contract each of which shall, without proof or accounting for the other counterparts, be deemed an original thereof.

The Owner does hereby certify that this Construction Contract was let in accordance with the provisions of Title 39, Code of Alabama 1975, as amended, and all other applicable provisions of law, and that the terms and commitments of this Construction Contract do not constitute a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment Number 26.

(15)

APPROVAL

ALABAMA STATE DEPARTMENT OF EDUCATION (SDE)
(*Required for locally-funded, SDE projects.*)

By_____ Date:_____
State Superintendent of Education

CONTRACTING PARTIES

_____
Contractor Company

By _____
Signature

Name & Title _____

_____
Owner Entity

By _____
Signature

Name(s) & Title(s) _____

Routing of the Construction Contract to reviewers and e-signers is automated through DocuSign. DocuSign links for fully locally-funded contract documents are available from DCM's Engage Portal at https://engagealabama-rpm.facilityforce.cloud

ARTICLE 37
CONTRACTOR'S and SUBCONTRACTORS' INSURANCE

(Provide entire Article 37 to Contractor's insurance representative.)

A. GENERAL

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

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

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

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

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

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

B. INSURANCE COVERAGES

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

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

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

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

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

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

(2) COMMERCIAL GENERAL LIABILITY INSURANCE

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

Coverage	Limit
.1 General Aggregate	$ 2,000,000.00 per Project
.2 Products, Completed Operations Aggregate	$ 2,000,000.00 per Project
.3 Personal and Advertising Injury	$ 1,000,000.00 per Occurrence
.4 Each Occurrence	$ 1,000,000.00

(b) Additional Requirements for Commercial General Liability Insurance:

.1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.

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

(3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

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

(b) The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA OR COMMERCIAL EXCESS LIABILITY INSURANCE

(a) Commercial Umbrella or Commercial Excess Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile

Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

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

.1 $ 5,000,000 per Occurrence

.2 $ 5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella or Commercial Excess Liability Insurance:

.1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

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

(5) BUILDER'S RISK INSURANCE

(a) The Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

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

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

(ii) Partial or complete occupancy by Owner; or

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

Exception: projects containing only abatement and/or only demolition do not require Builder's Risk insurance, unless required by the Owner. Note: projects containing any scope of work besides abatement and/or demolition require Builder's Risk insurance.

C. SUBCONTRACTORS' INSURANCE

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

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

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

D. TERMINATION of OBLIGATION to INSURE

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

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

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

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

E. WAIVERS of SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, sub-subcontractors, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to the person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work. Any provision found herein which attempts to waive or invalidate the subrogation interests of Alabama's State Insurance Fund against any party to this contract or any other person or entity is void and invalid. No such waiver is intended or made by the parties to this agreement with regard to any property insured by the State Insurance Fund.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

(1) # PERFORMANCE BOND

SURETY'S BOND NUMBER

Do not staple this form; use clips.

(2) The **PRINCIPAL** (*Company name and address of Contractor as appears in the Construction Contract*)
Name:
Address:

(3) The **SURETY** (*Company name and primary place of business*)
Name:
Address:

(4) The **OWNER** (*Entity name and address, same as appears in the Construction Contract*)
Name:
Address:

(5) The **PENAL SUM** of this Bond (the Contract Sum)

Dollars ($).

(6) **DATE** of the Construction Contract :

(7) The **PROJECT**: (*Same as appears in the Construction Contract*)

1. **WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY**, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above for the performance of the Contract, and Contract Change Orders, in accord with the requirements of the Contract Documents, which are incorporated herein by reference. If the Contractor performs the Contract, and Contract Change Orders, in accordance with the Contract Documents, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

3. Whenever the Architect gives the Contractor and the Surety, at their addresses stated above, a written Notice to Cure a condition for which the Contract may be terminated in accordance with the Contract Documents, the Surety may, within the time stated in the notice, cure or provide the Architect with written verification that satisfactory positive action is in process to cure the condition.

4. The Surety's obligation under this Bond becomes effective after the Contractor fails to satisfy a Notice to Cure and the Owner:

(a) gives the Contractor and the Surety, at their addresses stated above, a written Notice of Termination declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the notice; and

(b) gives the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation under this Bond.

5. In the presence of the conditions described in Paragraph 4, the Surety shall, at its expense:

(a) On the effective date of the Notice of Termination, take charge of the Work and be responsible for the safety, security, and protection of the Work, including materials and equipment stored on and off the Project site, and

(b) Within twenty-one days after the effective date of the Notice of Termination, proceed, or provide the Owner with written verification that satisfactory positive action is in process to facilitate proceeding promptly, to complete the Work in accordance with the Contract Documents, either with the Surety's resources or through a contract between the Surety and a qualified contractor to whom the Owner has no reasonable objection.

6. As conditions precedent to taking charge of and completing the Work pursuant to Paragraph 5, the Surety shall neither require, nor be entitled to, any agreements or conditions other than those of this Bond and the Contract Documents. In taking charge of and completing the Work, the Surety shall assume all rights and obligations of the Contractor under the Contract Documents; however, the Surety shall also have the right to assert "Surety Claims" to the Owner in accordance with the Contract Documents. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to promptly take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

7. By accepting this Bond as a condition of executing the Construction Contract, and by taking the actions described in Paragraph 4, the Owner agrees that:

(a) the Owner shall promptly advise the Surety of the unpaid balance of the Contract Sum and, upon request, shall make available or furnish to the Surety, at the cost of reproduction, any portions of the Project Record, and

(b) as the Surety completes the Work, or has it completed by a qualified contractor, the Owner shall pay the Surety, in accordance with terms of payment of the Contract Documents, the unpaid balance of the Contract Sum, less any amounts that may be or become due the Owner from the Contractor under the Construction Contract or from the Contractor or the Surety under this Bond.

8. In the presence of the conditions described in Paragraph 4, the Surety's obligation includes responsibility for the correction of Defective Work, liquidated damages, and reimbursement of any reasonable expenses incurred by the Owner as a result of the Contractor's default under the Contract, including architectural, engineering, administrative, and legal services.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

9. Nothing contained in this Bond shall be construed to mean that the Surety shall be liable to the Owner for an amount exceeding the Penal Sum of this Bond, except in the event that the Surety should be in default under the Bond by failing or refusing to take charge of and complete the Work pursuant to Paragraph 5. If the Surety should fail or refuse to take charge of and complete the Work, the Owner shall have the authority to take charge of and complete the Work, or have it completed, and the following costs to the Owner, less the unpaid balance of the Contract Sum, shall be recoverable under this Bond:

(a) the cost of completing the Contractor's responsibilities under the Contract, including correction of Defective Work;

(b) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to completing the Work;

(c) interest on, and the cost of obtaining, funds to supplement the unpaid balance of the Contract Sum as may be necessary to cover the foregoing costs;

(d) the fair market value of any reductions in the scope of the Work necessitated by insufficiency of the unpaid balance of the Contract Sum and available supplemental funds to cover the foregoing costs; and

(f) additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to ascertaining and collecting the Owner's losses under the Bond.

10. All claims and disputes arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

(8) **SIGNED AND SEALED** this _____ day of _____, _____.

(9 & 10)

SURETY:	**CONTRACTOR as PRINCIPAL:**
_____	_____
Company Name	Company Name
By_____	By _____
Signature	Signature
_____	_____
Name and Title	Name and Title

(11) NOTE: Original power of attorney for the Surety's signatory shall be furnished with each of the original three bond forms to be attached to each of the three contract copies (with original signatures) per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

(1) # PAYMENT BOND

SURETY'S BOND NUMBER

Do not staple this form; use clips.

(2) The **PRINCIPAL** (*Company name and address of Contractor, same as appears in the Construction Contract*)
Name:
Address:

(3) The **SURETY** (*Company name and primary place of business*)
Name:
Address:

(4) The **OWNER(s)** (*Entity name and address, same as appears in the Construction Contract*)
Name:
Address:

(5) The **PENAL SUM** of this Bond (the Contract Sum)

Dollars ($).

(6) **DATE** of the Construction Contract:

(7) The **PROJECT**: (*Same as appears in the Construction Contract*)

1. **WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY**, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above to promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract, which is incorporated herein by reference, and any modifications thereof by Contract Change Orders. If the Contractor and its Subcontractors promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders, then this obligation shall be null and void; otherwise to remain and be in full force and effect.

2. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

3. Any person that has furnished labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders for which payment has not been timely made may institute a civil action upon this Bond and have their rights and claims adjudicated in a civil action and judgment entered thereon. Notwithstanding the foregoing, a civil action may not be instituted on this bond until 45 days after written notice to the Surety of the amount claimed to be due and the nature of the claim. The civil action must commence not later than one year from the date of final settlement of the Contract. The giving of notice by registered or certified mail, postage prepaid, addressed to the Surety at any of its places of business or offices shall be deemed sufficient. In the event the Surety or Contractor fails to pay the claim in full within 45 days from the mailing of the notice, then the person or persons may recover from the Contractor and Surety, in addition to the amount of the claim, a reasonable attorney's fee based on the result, together with interest on the claim from the date of the notice.

4. Every person having a right of action on this bond shall, upon written application to the Owner indicating that labor, material, or supplies for the Work have been supplied and that payment has not been made, be promptly furnished a certified copy of this bond and the Construction Contract. The claimant may bring a civil action in the claimant's name on this Bond against the Contractor and the Surety, or either of them, in the county in which the Work is to be or has been performed or in any other county where venue is otherwise allowed by law.

5. This bond is furnished to comply with Code of Alabama, §39-1-1, and all provisions thereof shall be applicable to civil actions upon this bond.

6. All claims and disputes between Owner and either the Contractor or Surety arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

(8) **SIGNED AND SEALED** this _____ day of _____, _____.

(9 & 10)

SURETY:	**CONTRACTOR as PRINCIPAL:**
_____ Company Name	_____ Company Name
By_____ Signature	By _____ Signature
_____ Name and Title	_____ Name and Title

(11) NOTE: Original power of attorney for the Surety's signatory shall be furnished with each of the original three bond forms to be attached to each of the three contract copies (with original signatures) per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

GENERAL CONDITIONS of the CONTRACT

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ARTICLE 1
DEFINITIONS

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

A. ALABAMA DIVISION OF CONSTRUCTION MANAGEMENT: The Technical Staff of the Alabama Division of Construction Management.

B. ARCHITECT: The Architect is the person or entity lawfully licensed to practice architecture in the State of Alabama, who is under contract with the Owner as the primary design professional for the Project and identified as the Architect in the Construction Contract. The term "Architect" means the Architect or the Architect's authorized representative. If the employment of the Architect is terminated, the Owner shall employ a new Architect whose status under the Contract Documents shall be that of the former Architect. If the primary design professional for the Project is a Professional Engineer, the term "Engineer" shall be substituted for the term "Architect" wherever it appears in this document.

C. COMMISSION: The former Alabama Building Commission, for which the Alabama Division of Construction Management has been designated by the Legislature as its successor.

D. CONTRACT: The Contract is the embodiment of the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and Contractor and supersedes any prior written or oral negotiations, representations or agreements that are not incorporated into the Contract Documents. The Contract may be amended only by a Contract Change Order or a Modification to the Construction Contract. The contractual relationship which the Contract creates between the Owner and the Contractor extends to no other persons or entities. The Contract consists of the following Contract Documents, including all additions, deletions, and modifications incorporated therein before the execution of the Construction Contract:

(1) Construction Contract
(2) Performance and Payment Bonds
(3) Conditions of the Contract (General, Supplemental, and other Conditions)
(4) Specifications
(5) Drawings
(6) Contract Change Orders
(7) Modifications to the Construction Contract (applicable to PSCA Projects)

E. CONTRACT SUM: The Contract Sum is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. The term "Contract Sum" means the Contract Sum stated in the Construction Contract as may have been increased or decreased by Change Order(s) in accordance with the Contract Documents.

F. CONTRACT TIME: The Contract Time is the period of time in which the Contractor must achieve Substantial Completion of the Work. The date on which the Contract Time begins is specified in the written Notice To Proceed issued to the Contractor by the Owner or Director. The Date of Substantial Completion is the date established in accordance with Article 32. The term "Contract Time" means the Contract Time stated in the Construction Contract as may have been extended by Change Order(s) in accordance with the Contract Documents. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

G. CONTRACTOR: The Contractor is the person or persons, firm, partnership, joint venture, association, corporation, cooperative, limited liability company, or other legal entity, identified as such in the Construction Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

H. DCM: The Alabama Division of Construction Management.

I. DCM PROJECT INSPECTOR: The member of the Technical Staff of the Alabama Division of Construction Management to whom the Project is assigned relative to executing the respective inspections and authorities described in Article 16, Inspection of the Work.

J. DEFECTIVE WORK: The term "Defective Work" shall apply to: **(1)** any product, material, system, equipment, or service, or its installation or performance, which does not conform to the requirements of the Contract Documents, **(2)** in-progress or completed Work the workmanship of which does not conform to the quality specified or, if not specified, to the quality produced by skilled workers performing work of a similar nature on similar projects in the state, **(3) s**ubstitutions and deviations not properly submitted and approved or otherwise authorized, **(4)** temporary

supports, structures, or construction which will not produce the results required by the Contract Documents, and **(5)** materials or equipment rendered unsuitable for incorporation into the Work due to improper storage or protection.

K. DIRECTOR: The Director of the Alabama Division of Construction Management.

L. DRAWINGS: The Drawings are the portions of the Contract Documents showing graphically the design, location, layout, and dimensions of the Work, in the form of plans, elevations, sections, details, schedules, and diagrams.

M. NOTICE TO PROCEED: A proceed order issued by the Owner or Director, as applicable, fixing the date on which the Contractor shall begin the prosecution of the Work, which is also the date on which the Contract Time shall begin.

N.1 OWNER: The Owner is the entity or entities identified as such in the Construction Contract and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative. The term "Owner" as used herein shall be synonymous with the term "Awarding Authority".

N.2 AWARDING AUTHORITY: §39-2-1 (1) of the Code of Alabama, 1975, as amended definition: Any governmental board, commission, agency, body, authority, instrumentality, department, or subdivision of the state, its counties and municipalities. This term includes, but shall not be limited to, the Department of Transportation, the Division of Real Property Management of the Department of Finance, the State Board of Education, and any other entity contracting for public works. This term shall exclude the State Docks Department and any entity exempted from the competitive bid laws of the state by statute.

O. THE PROJECT: The Project is the total construction of which the Work required by these Contract Documents may be the entirety or only a part with other portions to be constructed by the Owner or separate contractors.

P. PROJECT MANUAL: The Project Manual is the volume usually assembled for the Work which may include the Advertisement for Bids, Instructions to Bidders, sample forms, General Conditions of the Contract, Supplementary Conditions, and Specifications of the Work.

Q. SPECIFICATIONS: The Specifications are that portion of the Contract Documents which set forth in writing the standards of quality and performance of products, equipment, materials, systems, and services and workmanship required for acceptable performance of the Work.

R. SUBCONTRACTOR: A Subcontractor is a person or entity who is undertaking the performance of any part of the Work by virtue of a contract with the Contractor. The term "Subcontractor" means a Subcontractor or its authorized representatives.

S. THE WORK: The Work is the construction and services required by the Contract Documents and includes all labor, materials, supplies, equipment, and other items and services as are necessary to produce the required construction and to fulfill the Contractor's obligations under the Contract. The Work may constitute the entire Project or only a portion of it.

ARTICLE 2
INTENT and INTERPRETATION of the CONTRACT DOCUMENTS

A. INTENT

It is the intent of the Contract Documents that the Contractor shall properly execute and complete the Work described by the Contract Documents, and unless otherwise provided in the Contract, the Contractor shall provide all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, in full accordance with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

B. COMPLEMENTARY DOCUMENTS

The Contract Documents are complementary. If Work is required by one Contract Document, the Contractor shall perform the Work as if it were required by all of the Contract Documents. However, the Contractor shall be required to perform Work only to the extent that is consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

C. 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:

(1) The Construction Contract.
(2) Addenda, with those of later date having precedence over those of earlier date.
(3) Supplementary Conditions (or other Conditions which modify the General Conditions of the Contract).
(4) General Conditions of the Contract.
(5) The Specifications.
(6) Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
(7) The Drawings; large scale drawings shall take precedence over smaller scale drawings.

D. ORGANIZATION

Except as may be specifically stated within the technical specifications, neither the organization of the Specifications into divisions, sections, or otherwise, nor any arrangement of the Drawings shall control how the Contractor subcontracts portions of the Work or assigns Work to any trade.

E. INTERPRETATION

(1) The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the Intent of the Contract Documents stated in preceding Paragraph A. Unless an item shown or described in the Contract Documents is specifically identified to be furnished or installed by the Owner or others or is identified as "Not In Contract" ("N.I.C."), the Contractor's obligation relative to that item shall be interpreted to include furnishing, assembling, installing, finishing, and/or connecting the item at the Contractor's expense to produce a product or system that is complete, appropriately tested, and in operative condition ready for use or subsequent construction or operation of the Owner or separate contractors. The omission of words or phases

for brevity of the Contract Documents, the inadvertent omission of words or phrases, or obvious typographical or written errors shall not defeat such interpretation as long as it is reasonably inferable from the Contract Documents as a whole.

(2) Words or phrases used in the Contract Documents which have well-known technical or construction industry meanings are to be interpreted consistent with such recognized meanings unless otherwise indicated.

(3) Except as noted otherwise, references to standard specifications or publications of associations, bureaus, or organizations shall mean the latest edition of the referenced standard specification or publication as of the date of the Advertisement for Bids.

(4) In the case of inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

(5) Any portions of the Contract Documents written in longhand must be initialed by all parties..

(6) Any doubt as to the meaning of the Contract Documents or any obscurity as to the wording of them, shall be promptly submitted in writing to the Architect for written interpretation, explanation, or clarification.

F. SEVERABILITY.

The partial or complete invalidity of any one or more provision of this Contract shall not affect the validity or continuing force and effect of any other provision.

ARTICLE 3
CONTRACTOR'S REPRESENTATIONS

By executing the Construction Contract the Contractor represents to the Owner:

A. The Contractor has visited the site of the Work to become familiar with local conditions under which the Work is to be performed and to evaluate reasonably observable conditions as compared with requirements of the Contract Documents.

B. The Contractor shall use its best skill and attention to perform the Work in an expeditious manner consistent with the Contract Documents.

C. The Contractor is an independent contractor and in performance of the Contract remains and shall act as an independent contractor having no authority to represent or obligate the Owner in any manner unless authorized by the Owner in writing.

ARTICLE 4
DOCUMENTS FURNISHED to CONTRACTOR

Unless otherwise provided in the Contract Documents, twenty sets of Drawings and Project Manuals will be furnished to the Contractor by the Architect without charge. Other copies requested will be furnished at reproduction cost.

ARTICLE 5
OWNERSHIP of DRAWINGS

All original or duplicated Drawings, Specifications, and other documents prepared by the Architect, and furnished to the Contractor are the property of the Architect and are to be used solely for this Project and not to be used in any manner for other work. Upon completion of the Work, all copies of Drawings and Specifications, with the exception of the Contractor's record set, shall be returned or accounted for by the Contractor to the Architect, on request.

ARTICLE 6
SUPERVISION, SUPERINTENDENT, and EMPLOYEES

A. SUPERVISION and CONSTRUCTION METHODS

(1) The term "Construction Methods" means the construction means, methods, techniques, sequences, and procedures utilized by the Contractor in performing the Work. The Contractor is solely responsible for supervising and coordinating the performance of the Work, including the selection of Construction Methods, unless the Contract Documents give other specific instructions concerning these matters.

(2) The Contractor is solely and completely responsible for job site safety, including the protection of persons and property in accordance with Article 14.

(3) The Contractor shall be responsible to the Owner for acts and omissions of not only the Contractor and its agents and employees, but all persons and entities, and their agents and employees, who are performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

(4) The Contractor shall be responsible to inspect the in-progress and completed Work to verify its compliance with the Contract Documents and to insure that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work.

B. SUPERINTENDENT

(1) The Contractor shall employ and maintain a competent level of supervision for the performance of the Work at the Project site, including a superintendent who shall:
(a) have full authority to receive instructions from the Architect or Owner and to act on those instructions and **(b)** be present at the Project site at all times during which Work is being performed.

(2) Before beginning performance of the Work, the Contractor shall notify the Architect in writing of the name and qualifications of its proposed superintendent so that the Owner may review the individual's qualifications. 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.

C. EMPLOYEES

The Contractor shall permit only fit and skilled persons to perform the Work. The Contractor shall enforce safety procedures, strict discipline, and good order among persons performing the Work. The Contractor will remove from its employment on the Project any person who deliberately or persistently produces non-conforming Work or who fails or refuses to conform to reasonable rules of personal conduct contained in the Contract Documents or implemented by the Owner and delivered to the Contractor in writing during the course of the Work.

ARTICLE 7
REVIEW of CONTRACT DOCUMENTS and FIELD CONDITIONS by CONTRACTOR

A. In order to facilitate assembly and installation of the Work in accordance with the Contract Documents, before starting each portion of the Work, the Contractor shall examine and compare the relevant Contract Documents, and compare them to relevant field measurements made by the Contractor and any conditions at the site affecting that portion of the Work.

B. If the Contractor discovers any errors, omissions, or inconsistencies in the Contract Documents, the Contractor shall promptly report them to the Architect as a written request for information that includes a detailed statement identifying the specific Drawings or Specifications that are in need of clarification and the error, omission, or inconsistency discovered in them.

(1) The Contractor shall not be expected to act as a licensed design professional and ascertain whether the Contract Documents comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, but the Contractor shall be obligated to promptly notify the Architect of any such noncompliance discovered by or made known to the Contractor. If the Contractor performs Work without fulfilling this notification obligation, the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

(2) The Contractor shall not be liable to the Owner for errors, omissions, or inconsistencies that may exist in the Contract Documents, or between the Contract Documents and conditions at the site, unless the Contractor knowingly fails to report a discovered error, omission, or inconsistency to the Architect, in which case the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

C. If the Contractor considers the Architect's response to a request for information to constitute a change to the Contract Documents involving additional costs and/or time, the Contractor shall follow the procedures of Article 20, Claims for Extra Cost or Extra Work.

D. If, with undue frequency, the Contractor requests information that is obtainable through reasonable examination and comparison of the Contract Documents, site conditions, and previous correspondence, interpretations, or clarifications, the Contractor shall be liable to the Owner for reasonable charges from the Architect for the additional services required to review, research, and respond to such requests for information.

ARTICLE 8
SURVEYS by CONTRACTOR

A. The Contractor shall provide competent engineering services to assure accurate execution of the Work in accordance with the Contract Documents. The Contractor shall verify the figures given for the contours, approaches and locations shown on the Drawings before starting any Work and be responsible for the accuracy of the finished Work. Without extra cost to the Owner, the Contractor shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments on rights or property of public or surrounding property owners.

B. 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 grade stakes, batter boards and other working points, lines and elevations. If the Work involves alteration of or addition to existing structures or improvements, the Contractor shall locate and measure elements of the existing conditions as is necessary to facilitate accurate fabrication, assembly, and installation of new Work in the relationship, alignment, and/or connection to the existing structure or improvement as is shown in the Contract Documents.

ARTICLE 9
SUBMITTALS

A. Where required by the Contract Documents, the Contractor shall submit shop drawings, product data, samples and other information (hereinafter referred to as Submittals) to the Architect for the purpose of demonstrating the way by which the Contractor proposes to conform to the requirements of the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

B. The Contractor shall be responsible to the Owner for the accuracy of its Submittals and the conformity of its submitted information to the requirements of the Contract Documents. Each Submittal shall bear the Contractor's approval, evidencing that the Contractor has reviewed and found the information to be in compliance with the requirements of the Contract Documents. Submittals which are not marked as reviewed and approved by the Contractor may be returned by the Architect without action.

C. The Contractor shall prepare and deliver its submittals to the Architect sufficiently in advance of construction requirements and in a sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. In coordinating the Submittal process with its construction schedule, the Contractor shall allow sufficient time to permit adequate review by the Architect.

D. By approving a Submittal the Contractor represents not only that the element of Work presented in the Submittal complies with the requirements of the Contract Documents, but also that the Contractor has:

(1) found the layout and/or dimensions in the Submittal to be comparable with those in the Contract Documents and other relevant Submittals and has made field measurements as necessary to verify their accuracy, and
(2) determined that products, materials, systems, equipment and/or procedures presented in the Submittal are compatible with those presented, or being presented, in other relevant Submittals and

with the Contractor's intended Construction Methods.

E. The Contractor shall not fabricate or perform any portion of the Work for which the Contract Documents require Submittals until the respective Submittals have been approved by the Architect.

F. In the case of a resubmission, the Contractor shall direct specific attention to all revisions in a Submittal. The Architect's approval of a resubmission shall not apply to any revisions that were not brought to the Architect's attention.

G. If the Contract Documents specify that a Submittal is to be prepared and sealed by a registered architect or licensed engineer retained by the Contractor, all drawings, calculations, specifications, and certifications of the Submittal shall bear the Alabama seal of registration and signature of the registered/licensed design professional who prepared them or under whose supervision they were prepared. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of such a Submittal, provided that all performance and design criteria that such Submittal must satisfy are sufficiently specified in the Contract Documents. The Architect will review, approve or take other appropriate action on such a Submittal only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria specified in the Contract Documents.

H. DEVIATIONS

(1) The Architect is authorized by the Owner to approve "minor" deviations from the requirements of the Contract Documents. "Minor" deviations are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Deviations which are not "minor" may be authorized only by the Owner through the Change Order procedures of Article 19.

(2) Any deviation from the requirements of the Contract Documents contained in a Submittal shall be clearly identified as a "Deviation from Contract Requirements" (or by similar language) within the Submittal and, in a letter transmitting the Submittal to the Architect, the Contractor shall direct the Architect's attention to, and request specific approval of, the deviation. Otherwise, the Architect's approval of a Submittal does not constitute approval of deviations from the requirements of the Contract Documents contained in the Submittal.

(3) The Contractor shall bear all costs and expenses of any changes to the Work, changes to work performed by the Owner or separate contractors, or additional services by the Architect required to accommodate an approved deviation unless the Contractor has specifically informed the Architect in writing of the required changes and a Change Order has been issued authorizing the deviation and accounting for such resulting changes and costs.

I. ARCHITECT'S REVIEW and APPROVAL

(1) The Architect will review the Contractor's Submittals for conformance with requirements of, and the design concept expressed in, the Contract Documents and will approve or take other appropriate action upon them. This review is not intended to verify the accuracy and completeness of details such as dimensions and quantities nor to substantiate installation instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor. However, the Architect shall advise the Contractor of any errors or omissions which the Architect

may detect during this review. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

(2) The Architect will review and respond to all Submittals with reasonable promptness to avoid delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time to permit adequate review.

(3) No corrections or changes to Submittals indicated by the Architect will be considered as authorizations to perform Extra Work. If the Contractor considers such correction or change of a Submittal to require Work which differs from the requirements of the Contract Documents, the Contractor shall promptly notify the Architect in writing in accordance with Article 20, Claims for Extra Cost or Extra Work.

J. CONFORMANCE with SUBMITTALS

The Work shall be constructed in accordance with approved Submittals.

ARTICLE 10
DOCUMENTS and SAMPLES at the SITE

A. "AS ISSUED" SET

The Contractor shall maintain at the Project site, in good order, at least one copy of all Addenda, Change Orders, supplemental drawings, written directives and clarifications, and approved Submittals intact as issued, and an updated construction schedule.

B. "POSTED" SET

The Contractor shall maintain at the Project site, in good order, at least one set of the Drawings and Project Manual into which the Contractor has "posted"(incorporated) all Addenda, Change Orders, supplemental drawings, clarifications, and other information pertinent to the proper performance of the Work. The Contractor shall assure that all sets of the Drawings and Project Manuals being used by the Contractor, Subcontractors, and suppliers are "posted" with the current information to insure that updated Contract Documents are used for performance of the Work.

C. RECORD SET

One set of the Drawings and Project Manual described in Paragraph B shall be the Contractor's record set in which the Contractor shall record all field changes, corrections, selections, final locations, and other information as will be duplicated on the "As-built" documents required under Article 11. The Contractor shall record such "as-built" information in its record set as it becomes available through progress of the Work. The Contractor's performance of this requirement shall be subject to confirmation by the Architect at any time as a prerequisite to approval of Progress Payments.

D. The documents and samples required by this Article to be maintained at the Project site shall be readily available to the Architect, Owner, DCM Project Inspector, and their representatives.

ARTICLE 11
"AS-BUILT" DOCUMENTS

A. Unless otherwise provided in the Contract Documents, the Contractor shall deliver two (2) sets of "As-built" documents, as described herein, to the Architect for submission to the Owner upon completion of the Work. Each set of "As-built' documents shall consist of a copy of the Drawings and Project Manual, in like-new condition, into which the Contractor has neatly incorporated all Addenda, Change Orders, supplemental drawings, clarifications, field changes, corrections, selections, actual locations of underground utilities, and other information as required herein or specified elsewhere in the Contract Documents.

B. The Contractor shall use the following methods for incorporating information into the "As-built" documents:

(1) Drawings

(a) To the greatest extent practicable, information shall be carefully drawn and lettered, in ink, on the Drawings in the form of sketches, details, plans, notes, and dimensions as required to provide a fully dimensioned record of the Work. When required for clarity, sketches, details, or partial plans shall be drawn on supplemental sheets and bound into the Drawings and referenced on the drawing being revised.

(b) Where a revised drawing has been furnished by the Architect, the drawing of latest date shall be bound into the Drawings in the place of the superseded drawing.

(c) Where a supplemental drawing has been furnished by the Architect, the supplemental drawing shall be bound into the Drawings in an appropriate location and referred to by notes added to the drawing being supplemented.

(d) Where the Architect has furnished details, partial plans, or lengthy notes of which it would be impractical for the Contractor to redraw or letter on a drawing, such information may be affixed to the appropriate drawing with transparent tape if space is available on the drawing.

(e) Any entry of information made in the Drawings that is the result of an Addendum or Change Order, shall identify the Addendum or Change Order from which it originated.

(2) Project Manual

(a) A copy of all Addenda and Change Orders, excluding drawings thereof, shall be bound in the front of the Project Manual.

(b) Where a document, form, or entire specification section is revised, the latest issue shall be bound into the Project Manual in the place of the superseded issue.

(c) Where information within a specification section is revised, the deleted or revised information shall be drawn through in ink and an adjacent note added identifying the Addendum or Change Order containing the revised information.

C. Within ten days after the Date of Substantial Completion of the Work, or the last completed portion of the Work, the Contractor shall submit the "As-built" documents to the Architect for approval. If the Architect requires that any corrections be made, the documents will be returned in a reasonable time for correction and resubmission.

ARTICLE 12
PROGRESS SCHEDULE

(Not applicable if the Contract Time is 60 days or less.)

A. The Contractor shall within fifteen days after the date of commencement stated in the Notice to Proceed, or such other time as may be provided in the Contract Documents, prepare and submit to the Architect for review and approval a practicable construction schedule informing the Architect and Owner of the order in which the Contractor plans to carry on the Work within the Contract Time. The Architect'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 Architect has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.

B. If a schedule format is not specified elsewhere in the Contract Documents, the construction schedule shall be prepared using DCM Form C-11, "Sample Progress Schedule and Report", (contained in the Project Manual) or similar format of suitable scale and detail to indicate the percentage of Work scheduled to be completed at the end of each month. At the end of each month the Contractor shall enter the actual percentage of completion on the construction schedule submit two copies to the Architect, and attach one copy to each copy of the monthly Application for Payment. The construction schedule shall be revised to reflect any agreed extensions of the Contract Time or as required by conditions of the Work.

C. If a more comprehensive schedule format is specified elsewhere in the Contract Documents or voluntarily employed by the Contractor, it may be used in lieu of DCM Form C-11.

D. The Contractor's construction schedule shall be used by the Contractor, Architect, and Owner 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 the amount of construction plant and equipment 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 Architect or Owner, the Contractor is not taking sufficient steps to regain schedule, the Architect may, with the Owner's concurrence, issue the Contractor a Notice to Cure pursuant to Article 27. In such a Notice to Cure the Architect may require the Contractor to submit such supplementary or revised construction schedules as may be deemed necessary to demonstrate the manner in which schedule will be regained.

ARTICLE 13
EQUIPMENT, MATERIALS, and SUBSTITUTIONS

A. 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.

B. 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.(hereinafter

referred to as "source"), 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 Paragraph D below apply. Such proposed substitutions are not to be purchased or installed without the Architect's written approval of the substitution.

C. If the Contract Documents identify three or more sources for a product, material, system, item of equipment or service to be used and the list of sources is not followed by "or approved equal" or similar wording, the Contractor may make substitution only after evaluation by the Architect and execution of an appropriate Contract Change Order.

D. 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.

ARTICLE 14
SAFETY and PROTECTION of PERSONS and PROPERTY

A. The Contractor shall be solely and completely responsible for conditions at the Project site, including safety of all persons (including employees) and property. The Contractor shall create, maintain, and supervise conditions and programs to facilitate and promote safe execution of the Work, and shall supervise the Work with the attention and skill required to assure its safe performance. Safety provisions shall conform to OSHA requirements and all other federal, state, county, and local laws, ordinances, codes, and regulations. Where any of these are in conflict, the more stringent requirement shall be followed. Nothing contained in this Contract shall be construed to mean that the Owner has employed the Architect nor has the Architect employed its consultants to administer, supervise, inspect, or take action regarding safety programs or conditions at the Project site.

B. The Contractor shall employ Construction Methods, safety precautions, and protective measures that will reasonably prevent damage, injury or loss to:

(1) workers and other persons on the Project site and in adjacent and other areas that may be affected by the Contractor's operations;

(2) the Work and materials and equipment to be incorporated into the Work and stored by the Contractor on or off the Project site; and

(3) other property on, or adjacent to, the Project site, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and other improvements not designated in the Contract Documents to be removed, relocated, or replaced.

C. The Contractor shall be responsible for the prompt remedy of damage and loss to property, including the filing of appropriate insurance claims, caused in whole or in part by the fault or negligence of the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

D. The Contractor shall comply with and give notices required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety and protection of persons or property, including without limitation notices to adjoining property owners of excavation or other construction activities that potentially could cause damage or injury to adjoining property or persons thereon.

E. The Contractor shall erect and maintain barriers, danger signs, and any other reasonable safeguards and warnings against hazards as may be required for safety and protection during performance of the Contract and shall notify owners and users of adjacent sites and utilities of conditions that may exist or arise which may jeopardize their safety.

F. If use or storage of explosives or other hazardous materials or equipment or unusual Construction Methods are necessary for execution of the Work, the Contractor shall exercise commensurate care and employ supervisors and workers properly qualified to perform such activity.

G. The Contractor shall furnish a qualified safety representative at the Project site whose duties shall include the prevention of accidents. The safety representative shall be the Contractor's superintendent, unless the Contractor assigns this duty to another responsible member of its on-site staff and notifies the Owner and Architect in writing of such assignment.

H. The Contractor shall not permit a load to be applied, or forces introduced, to any part of the construction or site that may cause damage to the construction or site or endanger safety of the construction, site, or persons on or near the site.

I. The Contractor shall have the right to act as it deems appropriate in emergency situations jeopardizing life or property. The Contractor shall be entitled to equitable adjustment of the Contract Sum or Contract Time for its efforts expended for the sole benefit of the Owner in an emergency. Such adjustment shall be determined as provided in Articles 19 and 20.

J. The duty of the Architect and the Architect's consultants to visit the Project site to conduct periodic inspections of the Work or for other purposes shall not give rise to a duty to review or approve the adequacy of the Contractor's safety program, safety supervisor, or any safety measure which Contractor takes or fails to take in, on, or near the Project site.

ARTICLE 15
HAZARDOUS MATERIALS

A. A Hazardous Material is any substance or material identified as hazardous under any federal, state, or local law or regulation, or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing its handling, disposal, and/or clean-up. Existing Hazardous Materials are Hazardous Materials discovered at the Project site and not introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

B. If, during the performance of the Work, the Contractor encounters a suspected Existing Hazardous Material, the Contractor shall immediately stop work in the affected area, take measures appropriate to the condition to keep people away from the suspected Existing Hazardous Material, and

immediately notify the Architect and Owner of the condition in writing.

C. The Owner shall obtain the services of an independent laboratory or professional consultant, appropriately licensed and qualified, to determine whether the suspected material is a Hazardous Material requiring abatement and, if so, to certify after its abatement that it has been rendered harmless. Any abatement of Existing Hazardous Materials will be the responsibility of the Owner. The Owner will advise the Contractor in writing of the persons or entities who will determine the nature of the suspected material and those who will, if necessary, perform the abatement. The Owner will not employ persons or entities to perform these services to whom the Contractor or Architect has reasonable objection.

D. After certification by the Owner's independent laboratory or professional consultant that the material is harmless or has been rendered harmless, work in the affected area shall resume upon written agreement between the Owner and Contractor. If the material is found to be an Existing Hazardous Material and the Contractor incurs additional cost or delay due to the presence and abatement of the material, the Contract Sum and/or Contract Time shall be appropriately adjusted by a Contract Change Order pursuant to Article 19.

E. The Owner shall not be responsible for Hazardous Materials introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable unless such Hazardous Materials were required by the Contract Documents.

ARTICLE 16
INSPECTION of the WORK

A. GENERAL

(1) The Contractor is solely responsible for the Work's compliance with the Contract Documents; therefore, the Contractor shall be responsible to inspect in-progress and completed Work, and shall verify its compliance with the Contract Documents and that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work. Neither the presence nor absence of inspections by the Architect, Owner, Director, DCM Project Inspector, any public authority having jurisdiction, or their representatives shall relieve the Contractor of responsibility to inspect the Work, for responsibility for Construction Methods and safety precautions and programs in connection with the Work, or from any other requirement of the Contract Documents.

(2) The Architect, Owner, Director, DCM Project Inspector, any public authority having jurisdiction, and their representatives shall have access at all times to the Work for inspection 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 in the Contract Documents, shall be subject to inspection, examination, and test at any and all places where such manufacture and/or construction are being carried on. Such inspections will not unreasonably interfere with the Contractor's operations.

(3) The Architect will inspect the Work as a representative of the Owner. The Architect's inspections may be supplemented by inspections by the DCM Project Inspector as a representative of the Alabama Division of Construction Management.

(4) The Contractor may be charged by the Owner for any extra cost of inspection incurred by the Owner or Architect on account of material and workmanship not being ready at the time of inspection set by the Contractor.

B. TYPES of INSPECTIONS

(1) SCHEDULED INSPECTIONS and CONFERENCES. Scheduled Inspections and Conferences are conducted by the Architect, scheduled by the Architect in coordination with the Contractor and DCM Project Inspector, and are attended by the Contractor and applicable Subcontractors, suppliers and manufacturers, and the DCM Project Inspector. Scheduled Inspections and Conferences of this Contract include:

(a) Pre-construction Conference.

(b) Pre-roofing Conference (not applicable if the Contract involves no roofing work)

(**c) Above Ceiling Inspection(s)**: An above ceiling inspection of all spaces in the building is required before the ceiling material is installed. Above ceiling inspections are to be conducted at a time when all above ceiling systems are complete and tested to the greatest extent reasonable pending installation of the ceiling material. System identifications and markings are to be complete. All fire-rated construction including fire-stopping of penetrations and specified identification above the ceiling shall be complete. Ceiling framing and suspension systems shall be complete with lights, grilles and diffusers, access panels, fire protection drops for sprinkler heads, etc., installed in their final locations to the greatest extent reasonable. Above ceiling framing to support ceiling mounted equipment shall be complete. The above ceiling construction shall be complete to the extent that after the inspection the ceiling material can be installed without disturbance.

(**d) Final Inspection(s):** A Final Inspection shall establish that the Work, or a designated portion of the Work, is Substantially Complete in accordance with Article 32 and is accepted by the Architect, Owner, and DCM Project Inspector as being ready for the Owner's occupancy or use. At the conclusion of this inspection, items requiring correction or completion ("punch list" items) shall be minimal and require only a short period of time for accomplishment to establish Final Acceptance of the Work. If the Work, or designated portion of the Work, includes the installation, or modification, of a fire alarm system or other life safety systems essential to occupancy, such systems shall have been tested and appropriately certified before the Final Inspection.

(**e) Year-end Inspection(s):** An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one year warranty period(s). The subsequent delivery of the Architect's report of this inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period in accordance with Article 35.

(2) PERIODIC INSPECTIONS. Periodic Inspections are conducted throughout the course of the Work by the Architect, the Architect's consultants, their representatives, and the DCM Project Inspector, jointly or independently, with or without advance notice to the Contractor.

(3) SPECIFIED INSPECTIONS and TESTS. Specified Inspections and Tests include inspections, tests, demonstrations, and approvals that are either specified in the Contract Documents or required by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction, to be performed by the Contractor, one of its Subcontractors, or an independent testing laboratory or firm (whether paid for by the Contractor or Owner).

C. INSPECTIONS by the ARCHITECT

(1) The Architect is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations as defined in Article 9 and "minor" changes as defined in Article 19), to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner.

(2) The Architect will visit the site at intervals appropriate to the stage of the Contractor's operations and as otherwise necessary to:

(a) become generally familiar with the in-progress and completed Work and the quality of the Work,

(b) determine whether the Work is progressing in general accordance with the Contractor's schedule and is likely to be completed within the Contract Time,

(c) visually compare readily accessible elements of the Work to the requirements of the Contract Documents to determine, in general, if the Contractor's performance of the Work indicates that the Work will conform to the requirements of the Contract Documents when completed,

(d) endeavor to guard the Owner against Defective Work,

(e) review and address with the Contractor any problems in implementing the requirements of the Contract Documents that the Contractor may have encountered, and

(f) keep the Owner fully informed about the Project.

(3) The Architect shall have the authority to reject Defective Work or require its correction, but shall not be required to make exhaustive investigations or examinations of the in-progress or completed portions of the Work to expose the presence of Defective Work. However, it shall be an obligation of the Architect to report in writing, to the Owner, Contractor, and DCM Project Inspector, any Defective Work recognized by the Architect.

(4) The Architect shall have the authority to require the Contractor to stop work only when, in the Architect's reasonable opinion, such stoppage is necessary to avoid Defective Work. The Architect shall not be liable to the Contractor or Owner for the consequences of any decisions made by the Architect in good faith either to exercise or not to exercise this authority.

(5) "Inspections by the Architect" includes appropriate inspections by the Architect's consultants as dictated by their respective disciplines of design and the stage of the Contractor's operations.

D. INSPECTIONS by the DCM PROJECT INSPECTOR

(1) The DCM Project Inspector will:

(a) participate in scheduled inspections and conferences as practicable,

(b) perform periodic inspections of in-progress and completed Work to ensure code compliance of the Project and general conformance of the Work with the Contract Documents, and

(c) monitor the Contractor's progress and performance of the Work.

(2) The DCM Project Inspector shall have the authority to:

(a) reject Work that is not in compliance with the State Building Code adopted by the DCM, unless the Work is in accordance with the Contract Documents in which case the DCM Project Inspector will advise the Architect to initiate appropriate corrective action, and

(b) notify the Architect, Owner, and Contractor of Defective Work recognized by the DCM Project Inspector.

(3) The DCM Project Inspector's periodic inspections will usually be scheduled around key stages of construction based upon information reported by the Architect. As the Architect or Owner deems appropriate, the DCM Project Inspector, as well as other members of the Technical Staff, can be requested to schedule special inspections or meetings to address specific matters. The written findings of DCM Project Inspector will be transmitted to the Owner, Contractor, and Architect.

(4) The DCM Project Inspector is not authorized 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 Contract Documents without concurrence of the Owner. The Contractor shall not proceed with Work as a result of instructions or findings of the DCM Project Inspector which the Contractor considers to be a change to the requirements of the Contract Documents without written authorization of the Owner through the Architect.

E. UNCOVERING WORK

(1) If the Contractor covers a portion of the Work before it is examined by the Architect and this is contrary to the Architect's request or specific requirements in the Contract Documents, then, upon written request of the Architect, the Work must be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

(2) Without a prior request or specific requirement that Work be examined by the Architect before it is covered, the Architect may request that Work be uncovered for examination and the Contractor shall uncover it. If the Work is in accordance with the Contract Documents, the Contract Sum shall be equitably adjusted under Article 19 to compensate the Contractor for the costs of uncovering and replacement. If the Work is not in accordance with the Contract Documents, uncovering, correction, and replacement shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

F. SPECIFIED INSPECTIONS and TESTS

(1) The Contractor shall schedule and coordinate Specified Inspections and Tests to be made at appropriate times so as not to delay the progress of the Work or the work of the Owner or separate contractors. If the Contract Documents require that a Specified Inspection or Test be witnessed or attended by the Architect or Architect's consultant, the Contractor shall give the Architect timely notice of the time and place of the Specified Inspection or Test. If a Specified Inspection or Test reveals that Work is not in compliance with requirements of the Contract Documents, the Contractor shall bear the costs of correction, repeating the Specified Inspection or Test, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services. Through appropriate Contract Change Order the Owner shall bear costs of tests, inspections or approvals which become Contract requirements subsequent to the receipt of bids.

(2) If the Architect, Owner, or public authority having jurisdiction determines that inspections, tests, demonstrations, or approvals in addition to Specified Inspections and Tests are required, the Contractor shall, upon written instruction from the Architect, arrange for their performance by an entity acceptable to the Owner, giving timely notice to the architect of the time and place of their performance. Related costs shall be borne by the Owner unless the procedures reveal that Work is not in compliance with requirements of the Contract Documents, in which case the Contractor shall

bear the costs of correction, repeating the procedures, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services.

(3) Unless otherwise required by the Contract Documents, required certificates of Specified Inspections and Tests shall be secured by the Contractor and promptly delivered to the Architect.

(4) Failure of any materials to pass Specified Inspections and Tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material for use in the Work.

ARTICLE 17
CORRECTION of DEFECTIVE WORK

A. The Contractor shall, at the Contractor's expense, promptly correct Defective Work rejected by the Architect or which otherwise becomes known to the Contractor, removing the rejected or nonconforming materials and construction from the project site.

B. Correction of Defective Work shall be performed in such a timely manner as will avoid delay of completion, use, or occupancy of the Work and the work of the Owner and separate contractors.

C. The Contractor shall bear all expenses related to the correction of Defective Work, including but not limited to: **(1)** additional testing and inspections, including repeating Specified Inspections and Tests**, (2)** reasonable services and expenses of the Architect, and **(3)** the expense of making good all work of the Contractor, Owner, or separate contractors destroyed or damaged by the correction of Defective Work.

ARTICLE 18
DEDUCTIONS for UNCORRECTED WORK

If the Owner deems it advisable and in the Owner's interest to accept Defective Work, the Owner may allow part or all of such Work to remain in place, provided an equitable deduction from the Contract Sum, acceptable to the Owner, is offered by the Contractor.

ARTICLE 19
CHANGES in the WORK

A. GENERAL

(1) The Owner may at any time direct the Contractor to make changes in the Work which are within the general scope of the Contract, including changes in the Drawings, Specifications, or other portions of the Contract Documents to add, delete, or otherwise revise portions of the Work. The Architect is authorized by the Owner to direct "minor" changes in the Work by written order to the Contractor. "Minor" changes in the Work are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Changes in the Work which are not "minor" may be authorized only by the Owner.

(2) If the Owner directs a change in the Work, the change shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract, stating their agreement upon the change or changes in the Work and the adjustments, if any, in the Contract Sum and the Contract Time.

(3) Subject to compliance with Alabama's Public Works Law, the Owner may, upon agreement by the Contractor, incorporate previously unawarded bid alternates into the Contract.

(4) In the event of a claim or dispute as to the appropriate adjustment to the Contract Sum or Contract Time due to a directive to make changes in the Work, the Work shall proceed as provided in this article subject to subsequent agreement of the parties or final resolution of the dispute pursuant to Article 24.

(5) Consent of surety will be obtained for all Contract Change Orders involving an increase in the Contract Sum.

(6) 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.

(7) All change orders require DCM Form C-12: Contract Change Order and DCM Form B-11: Change Order Justification. Only Change Orders 10% or greater of the current contract amount require the Owner's legal advisor's signature on DCM Form B-11: Change Order Justification.

B. DETERMINATION of ADJUSTMENT of the CONTRACT SUM

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 the Owner:

(1) Lump Sum. By mutual agreement to a lump sum based on or negotiated from an itemized cost proposal from the Contractor. Additions to the Contract Sum shall include the Contractor's direct costs plus a maximum 15% markup for overhead and profit. Where subcontract work is involved the total mark-up for the Contractor and a Subcontractor shall not exceed 25%. **Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%.** For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

(2) Unit Price. By application of Unit Prices included in the Contract or subsequently agreed to by the parties. However, if the character or quantity originally contemplated is materially changed so 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.

(3) Force Account. By directing the Contractor to proceed with the change in the Work on a "force account" basis under which 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, an 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 shall be limited to the following:

(a) costs of labor and supervision, including employee benefits, social security, retirement, unemployment and workers' compensation insurance required by law, agreement, or under Contractor's or Subcontractor's standard personnel policy;

(b) cost of materials, supplies and equipment, including cost of delivery, whether incorporated or consumed;

(c) rental cost of machinery and equipment, not to exceed prevailing local rates if contractor-owned;

(d) costs of premiums for insurance required by the Contract Documents, permit fees, and sales, use or similar taxes related to the change in the Work;

(e) reasonable credits to the Owner for the value of deleted Work, without Contractor or Subcontractor mark-ups; and

(f) for additions to the Contract Sum, mark-up of the Contractor's direct costs for overhead and profit not exceeding 15% on Contractor's work nor exceeding 25% for Contractor and Subcontractor on a Subcontractor's work. **Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%.** For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of insurance other than mentioned above, bonds, superintendent and other job office personnel, watchman, use and rental of small tools, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

C. ADJUSTMENT of the CONTRACT TIME due to CHANGES

(1) Unless otherwise provided in the Contract Documents, the Contract Time shall be equitably adjusted for the performance of a change provided that the Contractor notifies the Architect in writing that the change will increase the time required to complete the Work. Such notice shall be provided no later than:

(a) with the Contractor's cost proposal stating the number of days of extension requested, or

(b) within ten days after the Contractor receives a directive to proceed with a change in advance of submitting a cost proposal, in which case the notice should provide an estimated number of days of extension to be requested, which may be subject to adjustment in the cost proposal.

(2) The Contract Time shall be extended only to the extent that the change affects the time required to complete the entire Work of the Contract, taking into account the concurrent performance of the changed and unchanged Work.

D. CHANGE ORDER PROCEDURES

(1) If the Owner proposes to make a change in the Work, the Architect will request that the Contractor provide a cost proposal for making the change to the Work. The request shall be in writing and shall adequately describe the proposed change using drawings, specifications, narrative, or a combination thereof. Within 21 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 stated time within which the Contractor must submit a proposal may be extended if, within that time, the Contractor makes a written request with reasonable justification thereof.

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

(3) If the Contractor's proposal is acceptable to the Owner, or is negotiated to the mutual agreement of the Contractor and Owner, the Architect will prepare an appropriate Contract Change Order for execution. Upon receipt of the fully executed Contract Change Order, the Contractor shall proceed with the change.

(4) In advance of delivery of a fully executed Contract Change Order, the Architect may 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,
(b) states the agreed adjustments, if any, in Contract Sum and Contract Time,
(c) states that funds are available to pay for the change, and
(d) is signed by the Owner.

(5) If the Contractor and Owner cannot agree on the amount of the adjustment in the Contract Sum for a change, the Owner, through the Architect, may order the Contractor to proceed with the change on a Force Account 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.

(6) If the Contractor does not promptly respond to a request for a proposal, or the Owner determines that the change is essential to the final product of the Work and that the change must be effected immediately to avoid delay of the Project, the Owner may:

(a) determine with the Contractor a sufficient maximum amount to be authorized for the change and
(b) direct the Contractor to proceed with the change on a Force Account basis pending delivery of the Contractor's proposal, stating the maximum increase in the Contract Sum that is authorized for the change.

(7) Pending agreement of the parties or 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 costs or time extension. Once a dispute is resolved, it shall be implemented by preparation and execution of an appropriate Change Order.

ARTICLE 20
CLAIMS for EXTRA COST or EXTRA WORK

A. If the Contractor considers any instructions by the Architect, Owner, DCM Project Inspector, or public authority having jurisdiction to be contrary to the requirements of the Contract Documents and will involve extra work and/or cost under the Contract, the Contractor shall give the Architect written notice thereof within ten days after receipt of such instructions, and in any event before proceeding to execute such work. As used in this Article, "instructions" shall include written or

oral clarifications, directions, instructions, interpretations, or determinations.

B. The Contractor's notification pursuant to Paragraph 20.A shall state: (1) the date, circumstances, and source of the instructions, **(2)** that the Contractor considers the instructions to constitute a change to the Contract Documents and why, and **(3)** an estimate of extra cost and time that may be involved to the extent an estimate may be reasonably made at that time.

C. Except for claims relating to an emergency endangering life or property, no claim for extra cost or extra work shall be considered in the absence of prior notice required under Paragraph 20.A.

D. Within ten days of receipt of a notice pursuant to Paragraph 20.A, the Architect will respond in writing to the Contractor, stating one of the following:

(1) The cited instruction is rescinded.

(2) The cited instruction is a change in the Work and in which manner the Contractor is to proceed with procedures of Article 19, Changes in the Work.

(3) The cited instruction is reconfirmed, is not considered by the Architect to be a change in the Contract Documents, and the Contractor is to proceed with Work as instructed.

E. If the Architect's response to the Contractor is as in Paragraph 20.D(3), the Contractor shall proceed with the Work as instructed. If the Contractor continues to consider the instructions to constitute a change in the Contract Documents, the Contractor shall, within ten days after receiving the Architect's response, notify the Architect in writing that the Contractor intends to submit a claim pursuant to Article 24, Resolution of Claims and Disputes

ARTICLE 21
DIFFERING SITE CONDITIONS

A. DEFINITION

"Differing Site Conditions" are:

(1) subsurface or otherwise concealed physical conditions at the Project site which differ materially from those indicated in the Contract Documents, or

(2) unknown physical conditions at the Project site which are of an unusual nature, differing materially from conditions ordinarily encountered and generally recognized as inherent in construction activities of the character required by the Contract Documents.

B. PROCEDURES

If Differing Site Conditions are encountered, then the party discovering the condition shall promptly notify the other party before the condition is disturbed and in no event later than ten days after discovering the condition. Upon such notice and verification that a Differing Site Condition exists, the Architect will, with reasonable promptness and with the Owner's concurrence, make changes in the Drawings and/or Specifications as are deemed necessary to conform to the Differing Site Condition. Any increase or decrease in the Contract Sum or Contract Time that is warranted by the changes will be made as provided under Article 19, Changes in the Work. If the Architect determines a Differing Site Condition has not been encountered, the Architect shall notify the

Owner and Contractor in writing, stating the reason for that determination.

ARTICLE 22
CLAIMS for DAMAGES

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time after the discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

ARTICLE 23
DELAYS

A. A delay beyond the Contractor's control at any time in the commencement or progress of Work by an act or omission of the Owner, Architect, or any separate contractor or by labor disputes, unusual delay in deliveries, unavoidable casualties, fires, abnormal floods, tornadoes, or other cataclysmic events of nature, may entitle the Contractor to an extension of the Contract Time provided, however, that the Contractor shall, within ten days after the delay first occurs, give written notice to the Architect of the cause of the delay and its probable effect on progress of the entire Work.

B. Adverse weather conditions that are more severe than anticipated for the locality of the Work during any given month may entitle the Contractor to an extension of Contract Time provided, however;

(1) the weather conditions had an adverse effect on construction scheduled to be performed during the period in which the adverse weather occurred, which in reasonable sequence would have an effect on completion of the entire Work,

(2) the Contractor shall, within twenty-one days after the end of the month in which the delay occurs, give the Architect written notice of the delay that occurred during that month and its probable effect on progress of the Work, and

(3) within a reasonable time after giving notice of the delay, the Contractor provides the Architect with sufficient data to document that the weather conditions experienced were unusually severe for the locality of the Work during the month in question. Unless otherwise provided in the Contract Documents, data documenting unusually severe weather conditions shall compare actual weather conditions to the average weather conditions for the month in question during the previous five years as recorded by the National Oceanic and Atmospheric Administration (NOAA) or similar record-keeping entities.

C. Adjustments, if any, of the Contract Time pursuant to this Article shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract or, at closeout of the Contract, by mutual written agreement between the Contractor and Owner. The adjustment of the Contract Time shall not exceed the extent to which the delay extends the time required to complete the entire Work of the Contract.

D. The Contractor shall not be entitled to any adjustment of the Contract Sum for damage due to delays claimed pursuant to this Article unless the delay was caused by the Owner or Architect and was either:

(1) the result of bad faith or active interference or

(2) beyond the contemplation of the parties and not remedied within a reasonable time after notification by the Contractor of its presence.

ARTICLE 24
RESOLUTION of CLAIMS and DISPUTES

A. APPLICABILITY of ARTICLE

(1) As used in this Article, "Claims and Disputes" include claims or disputes asserted by the Contractor, its Surety, or Owner arising out of or related to the Contract, or its breach, including without limitation claims seeking, under the provisions of the Contract, equitable adjustment of the Contract Sum or Contract Time and claims and disputes arising between the Contractor (or its Surety) and Owner regarding interpretation of the Contract Documents, performance of the Work, or breach of or compliance with the terms of the Contract.

(2) "Resolution" addressed in this Article applies only to Claims and Disputes arising between the Contractor (or its Surety) and Owner and asserted after execution of the Construction Contract and prior to the date upon which final payment is made. Upon making application for final payment the Contractor may reserve the right to subsequent Resolution of existing Claims by including a list of all Claims, in stated amounts, which remain to be resolved and specifically excluding them from any release of claims executed by the Contractor, and in that event Resolution may occur after final payment is made.

B. CONTINUANCE of PERFORMANCE

An unresolved Claim or Dispute shall not be just cause for the Contractor to fail or refuse to proceed diligently with performance of the Contract or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

C. GOOD FAITH EFFORT to SETTLE

The Contractor and Owner agree that, upon the assertion of a Claim by the other, they will make a good faith effort, with the Architect's assistance and advice, to achieve mutual resolution of the Claim. If mutually agreed, the Contractor and Owner may endeavor to resolve a Claim through mediation. If efforts to settle are not successful, the Claim shall be resolved in accordance with paragraph D or E below, whichever applies.

D FINAL RESOLUTION for STATE-FUNDED CONTRACTS

(1) If the Contract is funded in whole or in part with state funds, the final Resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner shall be by the Director, whose decision shall be final, binding, and conclusive upon the Contractor, its Surety, and the Owner.

(2) When it becomes apparent to the party asserting a Claim (the Claimant) that an impasse to mutual resolution has been reached, the Claimant may request in writing to the Director that the Claim be resolved by decision of the Director. Such request by the Contractor (or its Surety) shall be submitted through the Owner. Should the Owner fail or refuse to submit the Contractor's request within ten days of receipt of same, the Contractor may forward such request directly to the Director. Upon receipt of a request to resolve a Claim, the Director will instruct the parties as to procedures to be initiated and followed.

(3) If the respondent to a Claim fails or refuses to participate or cooperate in the Resolution procedures to the extent that the Claimant is compelled to initiate legal proceedings to induce the Respondent to participate or cooperate, the Claimant will be entitled to recover, and may amend its Claim to include, the expense of reasonable attorney's fees so incurred.

E. FINAL RESOLUTION for LOCALLY-FUNDED CONTRACTS

If the Contract is funded in whole with funds provided by a city or county board of education or other local governmental authority and the Contract Documents do not stipulate a binding alternative dispute resolution method, the final resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner may be by any legal remedy available to the parties. Alternatively, upon the written agreement of the Contractor (or its Surety) and the Owner, final Resolution of Claims and Disputes may be by submission to binding arbitration before a neutral arbitrator or panel or by submission to the Director in accordance with preceding Paragraph D.

ARTICLE 25
OWNER'S RIGHT to CORRECT DEFECTIVE WORK

If the Contractor fails or refuses to correct Defective Work in a timely manner that will avoid delay of completion, use, or occupancy of the Work or work by the Owner or separate contractors, the Architect may give the Contractor written Notice to Cure the Defective Work within a reasonable, stated time. If within ten days after receipt of the Notice to Cure the Contractor has not proceeded and satisfactorily continued to cure the Defective Work or provided the Architect with written verification that satisfactory positive action is in process to cure the Defective Work, the Owner may, without prejudice to any other remedy available to the Owner, correct the Defective Work and deduct the actual cost of the correction from payment then or thereafter due to the Contractor.

ARTICLE 26
OWNER'S RIGHT to STOP or SUSPEND the WORK

A. STOPPING the WORK for CAUSE

If the Contractor fails to correct Defective Work or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work, or any part of the Work, until the cause for the Owner's directive has been eliminated; however, the Owner's right to stop the Work shall not be construed as a duty of the Owner to be exercised for the benefit of the Contractor or any other person or entity.

B. SUSPENSION by the OWNER for CONVENIENCE

(1) The Owner may, at any time and without cause, direct the Contractor in writing to suspend, delay or interrupt the Work, or any part of the Work, for a period of time as the Owner may determine.

(2) The Contract Sum and Contract Time shall be adjusted, pursuant to Article 19, for reasonable increases in the cost and time caused by an Owner-directed suspension, delay or interruption of Work for the Owner's convenience. However, no adjustment to the Contract Sum shall be made to the extent that the same or concurrent Work is, was or would have been likewise suspended, delayed or interrupted for other reasons not caused by the Owner.

ARTICLE 27
OWNER'S RIGHT to TERMINATE CONTRACT

A. TERMINATION by the OWNER for CAUSE

(1) Causes: The Owner may terminate the Contractor's right to complete the Work, or any designated portion of the Work, if the Contractor:

(a) should be adjudged bankrupt, or should make a general assignment for the benefit of the Contractor's creditors, or if a receiver should be appointed on account of the Contractor's insolvency to the extent termination for these reasons is permissible under applicable law;

(b) refuses or fails to prosecute the Work, or any part of the Work, with the diligence that will insure its completion within the Contract Time, including any extensions, or fails to complete the Work within the Contract Time;

(c) refuses or fails to perform the Work, including prompt correction of Defective Work, in a manner that will insure that the Work, when fully completed, will be in accordance with the Contract Documents;

(d) fails to pay for labor or materials supplied for the Work or to pay Subcontractors in accordance with the respective Subcontract;

(e) persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction, or the instructions of the Architect or Owner; or

(f) is otherwise guilty of a substantial breach of the Contract.

(2) Procedure for Unbonded Construction Contracts (Generally, contracts less than $100,000):

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor written notice to cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor written notice that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a seven day Notice of Termination

without giving the Contractor another Notice to Cure.

(d) At the expiration of the seven days of the termination notice, the Owner may:

.1 take possession of the site, of all materials and equipment stored on and off site, and of all Contractor-owned tools, construction equipment and machinery, and facilities located at the site, and

.2 finish the Work by whatever reasonable method the Owner may deem expedient.

(e) The Contractor shall not be entitled to receive further payment under the Contract until the Work is completed.

(f) If the Owner's cost of completing the Work, including correction of Defective Work, compensation for additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees due to the default and termination, is less than the unpaid balance of the Contract Sum, the excess balance less liquidated damages for delay shall be paid to the Contractor. If such cost to the Owner including attorney's fees, plus liquidated damages, exceeds the unpaid balance of the Contract Sum, the Contractor shall pay the difference to the Owner. Final Resolution of any claim or Dispute involving the termination or any amount due any party as a result of the termination shall be pursuant to Article 24.

(g) Upon the Contractor's request, the Owner shall furnish to the Contractor a detailed accounting of the Owner's cost of completing the Work.

(3) Procedure for Bonded Construction Contracts (Generally, contracts of $100,000 or more):

(a) Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor and its Surety written Notice to Cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

(b) Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor and its Surety written notice declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

(c) If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a Notice of Termination without giving the Contractor another Notice to Cure.

(d) Demand on the Performance Bond: With the Notice of Termination the Owner shall give the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation to take charge of and complete the Work in accordance with the terms of the Performance Bond.

(e) Surety Claims: Upon receiving the Owner's demand on the Performance Bond, the Surety shall assume all rights and obligations of the Contractor under the Contract. However, the Surety shall also have the right to assert "Surety Claims" to the Owner, which are defined as claims relating to acts or omissions of the Owner or Architect prior to termination of the Contractor which may have prejudiced its rights as Surety or its interest in the unpaid balance of the Contract Sum. If the Surety wishes to assert a Surety Claim, it shall give the Owner, through the Architect, written notice within twenty-one days after first recognizing the condition giving rise to the Surety Claim. The Surety Claim shall then be submitted to the Owner, through the Architect, no later than sixty days after giving notice thereof, but no such Surety Claims shall be considered if submitted after the date upon which final payment

becomes due. Final resolution of Surety Claims shall be pursuant to Article 24, Resolution of Claims and Disputes. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

(f) Payments to Surety: The Surety shall be paid for completing the Work in accordance with the Contract Documents as if the Surety were the Contractor. The Owner shall have the right to deduct from payments to the Surety any reasonable costs incurred by the Owner, including compensation for additional architectural, engineering, managerial, and administrative services, and attorneys' fees as necessitated by termination of the Contractor and completion of the Work by the Surety. No further payments shall be made to the Contractor by the Owner. The Surety shall be solely responsible for any accounting to the Contractor for the portion of the Contract Sum paid to Surety by Owner or for the costs and expenses of completing the Work.

(4) Wrongful Termination: If any notice of termination by the Owner for cause, made in good faith, is determined to have been wrongly given, such termination shall be effective and compensation therefore determined as if it had been a termination for convenience pursuant to Paragraph B below.

B. TERMINATION by the OWNER for CONVENIENCE

(1) The Owner may, without cause and at any time, terminate the performance of Work under the Contract in whole, or in part, upon determination by the Owner that such termination is in the Owner'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 Owner, the Contractor shall:

(a) stop Work as specified in the notice;

(b) enter into no further subcontracts or purchase orders for 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 Owner, 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, and any reasonable costs incurred because of the termination. Such payment shall include reasonable mark-up of costs for overhead and profit, not to exceed the limits stated in Article 19, Changes in the Work. The Contractor shall be entitled to receive payment for reasonable anticipated overhead ("home office") and 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 Owner. Final modification of the Contract shall be by Contract Change Order pursuant to Article 19. Any Claim or Dispute involving the termination or any amount due a party as a result shall be resolved pursuant to Article 24.

ARTICLE 28
CONTRACTOR'S RIGHT to SUSPEND or TERMINATE the CONTRACT

A. SUSPENSION by the OWNER

If all of the Work is suspended or delayed for the Owner's convenience or under an order of any court, or other public authority, for a period of sixty days, through no act or fault of the Contractor or a Subcontractor, or anyone for whose acts they may be liable, then the Contractor may give the Owner a written Notice of Termination which allows the Owner fourteen days after receiving the Notice in which to give the Contractor appropriate written authorization to resume the Work. Absent the Contractor's receipt of such authorization to resume the Work, the Contract shall terminate upon expiration of this fourteen day period and the Contractor will be compensated by the Owner as if the termination had been for the Owner's convenience pursuant to Article 27.B.

B. NONPAYMENT

The Owner's failure to pay the undisputed amount of an Application for Payment within sixty days after receiving it from the Architect (Certified pursuant to Article 30) shall be just cause for the Contractor to give the Owner fourteen days' written notice that the Work will be suspended pending receipt of payment but that the Contract shall terminate if payment is not received within fourteen days (or a longer period stated by the Contractor) of the expiration of the fourteen day notice period.

(1) If the Work is then suspended for nonpayment, but resumed upon receipt of payment, the Contractor will be entitled to compensation as if the suspension had been by the Owner pursuant to Article 26, Paragraph B.

(2) If the Contract is then terminated for nonpayment, the Contractor will be entitled to compensation as if the termination had been by the Owner pursuant to Article 27, Paragraph B.

ARTICLE 29
PROGRESS PAYMENTS

A. FREQUENCY of PROGRESS PAYMENTS

Unless otherwise provided in the Contract Documents, the Owner will make payments to the Contractor as the Work progresses based on monthly estimates prepared and certified by the Contractor, approved and certified by the Architect, and approved by the Owner and other authorities whose approval is required.

B. SCHEDULE of VALUES

Within ten days after receiving the Notice to Proceed the Contractor shall submit to the Architect a DCM Form C-10SOV, Schedule of Values, which is a breakdown of the Contract Sum showing the value of the various parts of the Work for billing purposes. The Schedule of Values shall be printable on 8.5" × 11" and shall divide the Contract Sum into as many parts ("line items") as the Architect and Owner determine necessary to permit evaluation and to show amounts attributable to

Subcontractors. The Contractor's overhead and profit are to be proportionately distributed throughout the line items of the Schedule of Values. Upon approval, the Schedule of Values shall be used as a basis for monthly Applications for Payment, unless it is later found to be in error. Approved change order amounts shall be added to or incorporated into the Schedule of Values as mutually agreed by the Contractor and Architect.

C. APPLICATIONS for PAYMENTS

(1) Based on the approved Schedule of Values, each DCM Form C-10, Application and Certificate for Payment shall show the Contractor's estimate of the value of Work performed in each line item as of the end of the billing period. The Contractor's cost of materials and equipment not yet incorporated into the Work, but delivered and suitably stored on the site, may be considered in monthly Applications for Payment. One payment application per month may be submitted. Each DCM Form C-10, Application and Certificate for Payment shall match to the penny and be accompanied by an attached DCM Form C-10SOV, Schedule of Values.

(2) The Contractor's estimate of the value of Work performed and stored materials must represent such reasonableness as to warrant certification by the Architect to the Owner in accordance with Article 30. Each monthly Application for Payment shall be supported by such data as will substantiate the Contractor's right to payment, including without limitation copies of requisitions from subcontractors and material suppliers.

(3) If no other date is stated in the Contract Documents or agreed upon by the parties, each Application for Payment shall be submitted to the Architect on or about the first day of each month and payment shall be issued to the Contractor within thirty days after an Application for Payment is Certified pursuant to Article 30 and delivered to the Owner.

(4) The Applications for Payment of State Agency/Authority projects and Public School and College Authority (PSCA)-funded projects must be activated via the appropriate DocuSign link available from DCM's Engage Portal at https://engagealabama-rpm.facilityforce.cloud.

D. MATERIALS STORED OFF SITE

Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

(1) the contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the off site location;

(2) a Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party;

(3) the Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner;

(4) the materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner; and

(5) compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest.

E. RETAINAGE

(1) "Retainage" is defined as the money earned and, therefore, belonging to the Contractor (subject to final settlement of the Contract) which has been retained by the Owner conditioned on final completion and acceptance of all Work required by the Contract Documents. Retainage shall not be relied upon by Contractor (or Surety) to cover or off-set unearned monies attributable to uncompleted or uncorrected Work.

(2) In making progress payments the Owner shall retain five percent of the estimated value of Work performed and the value of the materials stored for the Work; but after retainage has been held upon fifty percent of the Contract Sum, no additional retainage will be withheld.

F. CONTRACTOR'S CERTIFICATION

(1) Each Application for Payment shall bear the Contractor's certification that, to the best of the Contractor's knowledge, information, and belief, the Work covered by the Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payments were issued and payments received from the Owner and that the current payment shown in the Application for Payment has not yet been received.

(2) By making this certification the Contractor represents to the Architect and Owner that, upon receipt of previous progress payments from the Owner, the Contractor has promptly paid each Subcontractor, in accordance with the terms of its agreement with the Subcontractor, the amount due the Subcontractor from the amount included in the progress payment on account of the Subcontractor's Work and stored materials. The Architect and Owner may advise Subcontractors and suppliers regarding percentages of completion or amounts requested and/or approved in an Application for Payment on account of the Subcontractor's Work and stored materials.

G. PAYMENT ESTABLISHES OWNERSHIP

All material and Work covered by progress payments shall become the sole property of the Owner, but the Contractor shall not be relieved from the sole responsibility for the care and protection of material and Work upon which payments have been made and for the restoration of any damaged material and Work.

ARTICLE 30
CERTIFICATION and APPROVALS for PAYMENT

A. The Architect's review, approval, and certification of Applications for Payment shall be based on the Architect's general knowledge of the Work obtained through site visits and the information provided by the Contractor with the Application. The Architect shall not be required to perform exhaustive examinations, evaluations, or estimates of the cost of completed or uncompleted Work or stored materials to verify the accuracy of amounts requested by the Contractor, but the Architect shall have the authority to adjust the Contractor's estimate when, in the Architect's reasonable opinion, such estimates are overstated or understated.

B. Within seven days after receiving the Contractor's monthly Application for Payment, or such other time as may be stated in the Contract Documents, the Architect will take one of the following actions:

(1) The Architect will approve and certify the Application as submitted and forward it to the Owner as a Certification for Payment for approval by the Owner (and other approving authorities, if any) and payment.

(2) If the Architect takes exception to any amounts claimed by the Contractor and the Contractor and Architect cannot agree on revised amounts, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to certify to the Owner, transmitting a copy of same to the Contractor.

(3) To the extent the Architect determines may be necessary to protect the Owner from loss on account of any of the causes stated in Article 31, the Architect may subtract from the Contractor's estimates and will issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due and notify the Contractor and Owner in writing of the Architect's reasons for withholding payment in whole or in part.

C. Neither the Architect's issuance of a Certificate for Payment nor the Owner's resulting progress payment shall be a representation to the Contractor that the Work in progress or completed at that time is accepted or deemed to be in conformance with the Contract Documents.

D. The Architect shall not be required to determine that the Contractor has promptly or fully paid Subcontractors and suppliers or how or for what purpose the Contractor has used monies paid under the Construction Contract. However, the Architect may, upon request and if practical, inform any Subcontractor or supplier of the amount, or percentage of completion, approved or paid to the Contractor on account of the materials supplied or the Work performed by the Subcontractor.

ARTICLE 31
PAYMENTS WITHHELD

A. The Architect may nullify or revise a previously issued Certificate for Payment prior to Owner's payment thereunder to the extent as may be necessary in the Architect's opinion to protect the Owner from loss on account of any of the following causes not discovered or fully accounted for at the time of the certification or approval of the Application for Payment:

(1) Defective Work;
(2) filed, or reasonable evidence indicating probable filing of, claims arising out of the Contract by other parties against the Contractor;
(3) the Contractor's failure to pay for labor, materials or equipment or to pay Subcontractors;
(4) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
(5) damage suffered by the Owner or another contractor caused by the Contractor, a Subcontractor, or anyone for whose acts they may be liable;
(6) 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; or
(7) the Contractor's persistent failure to conform to the requirements of the Contract Documents.

B. If the Owner deems it necessary to withhold payment pursuant to preceding Paragraph A, the Owner will notify the Contractor and Architect in writing of the amount to be withheld and the reason for same.

C. The Architect shall not be required to withhold payment for completed or partially completed Work for which compliance with the Contract Documents remains to be determined by Specified Inspections or Final Inspections to be performed in their proper sequence. However, if Work for which payment has been approved, certified, or made under an Application for Payment is subsequently determined to be Defective Work, the Architect shall determine an appropriate amount that will protect the Owner's interest against the Defective Work.

(1) If payment has not been made against the Application for Payment first including the Defective Work, the Architect will notify the Owner and Contractor of the amount to be withheld from the payment until the Defective Work is brought into compliance with the Contract Documents.

(2) If payment has been made against the Application for Payment first including the Defective Work, the Architect will withhold the appropriate amount from the next Application for Payment submitted after the determination of noncompliance, such amount to then be withheld until the Defective Work is brought into compliance with the Contract Documents.

D. The amount withheld will be paid with the next Application for Payment certified and approved after the condition for which the Owner has withheld payment is removed or otherwise resolved to the Owner's satisfaction.

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

ARTICLE 32
SUBSTANTIAL COMPLETION

A. Substantial Completion is the stage in the progress of the Work when the Work or designated portion of the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use without disruption or interference by the Contractor in completing or correcting any remaining unfinished Work ("punch list" items). Substantial Completion of the Work, or a designated portion of the Work, is not achieved until so agreed in a Certificate of Substantial Completion signed by the Contractor, Architect, Owner, and Technical Staff of the Alabama Division of Construction Management.

B. The Contractor shall notify the Architect in writing when it considers the Work, or a portion of the Work which the Owner has agreed to accept separately, to be substantially complete and ready for a Final Inspection pursuant to Article 16. In this notification the Contractor shall identify any items remaining to be completed or corrected for Final Acceptance prior to final payment.

C. Substantial Completion is achieved and a Final Inspection is appropriate only when a minimal number of punch list items exists and only a short period of time will be required to correct or complete them. Upon receipt of the Contractor's notice for a Final Inspection, the Architect will advise the Contractor in writing of any conditions of the Work which the Architect or Owner is

aware do not constitute Substantial Completion, otherwise, a Final Inspection will proceed within a reasonable time after the Contractor's notice is given. However, the Architect will not be required to prepare lengthy listings of punch list items; therefore, if the Final Inspection discloses that Substantial Completion has not been achieved, the Architect may discontinue or suspend the inspection until the Contractor does achieve Substantial Completion.

D. CERTIFICATE of SUBSTANTIAL COMPLETION

(1) When the Work or a designated portion of the Work is substantially complete, the Architect will prepare (via the appropriate DocuSign link available from DCM's Engage Portal at https://engagealabama-rpm.facilityforce.cloud) and sign a Certificate of Substantial Completion to be signed in order by the Contractor, Owner, and Alabama Division of Construction Management.

(2) When signed by all parties, the Certificate of Substantial Completion shall establish the Date of Substantial Completion which is the date upon which:

(a) the Work, or designated portion of the Work, is accepted by the Architect, Owner, and Alabama Division of Construction Management as being ready for occupancy,

(b) the Contractor's one-year and special warranties for the Work covered by the Certificate commence, unless stated otherwise in the Certificate (the one-year warranty for punch list items completed or corrected after the period allowed in the Certificate shall commence on the date of their Final Acceptance), and

(c) Owner becomes responsible for building security, maintenance, utility services, and insurance, unless stated otherwise in the Certificate.

(3) The Certificate of Substantial Completion shall set the time within which the Contractor shall finish all items on the "punch list" accompanying the Certificate. The completion of punch list items shall be a condition precedent to Final Payment.

(4) If the Work or designated portion covered by a Certificate of Substantial Completion includes roofing work, the General Contractor's (5-year) Roofing Guarantee, DCM Form C-9, must be executed by the Contractor and attached to the Certificate of Substantial Completion. If the Contract Documents specify any other roofing warranties to be provided by the roofing manufacturer, Subcontractor, or Contractor, they must also be attached to the Certificate of Substantial Completion. The Alabama Division of Construction Management will not sign the Certificate of Substantial Completion in the absence of the roofing guarantees.

E. The Date of Substantial Completion of the Work, as set in the Certificate of Substantial Completion of the Work or of the last completed portion of the Work, establishes the extent to which the Contractor is liable for Liquidated Damages, if any; however, should the Contractor fail to complete all punch list items within thirty days, or such other time as may be stated in the respective Certificate of Substantial Completion, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of such failure to complete punch list items in a timely manner.

ARTICLE 33
OCCUPANCY or USE PRIOR to COMPLETION

A. UPON SUBSTANTIAL COMPLETION

Prior to completion of the entire Work, the Owner may occupy or begin utilizing any designated portion of the Work on the agreed Date of Substantial Completion of that portion of the Work.

B. BEFORE SUBSTANTIAL COMPLETION

(1) The Owner shall not occupy or utilize any portion of the Work before Substantial Completion of that portion has been achieved.

(2) The Owner may deliver furniture and equipment and store, or install it in place ready for occupancy and use, in any designated portion of the Work before it is substantially completed under the following conditions:

(a) The Owner's storage or installation of furniture and equipment will not unreasonably disrupt or interfere with the Contractor's completion of the designated portion of the Work.

(b) The Contractor consents to the Owner's planned action (such consent shall not be unreasonably withheld).

(c) The Owner shall be responsible for insurance coverage of the Owner's furniture and equipment, and the Contractor's liability shall not be increased.

(d) The Contractor, Architect, and Owner will jointly inspect and record the condition of the Work in the area before the Owner delivers and stores or installs furniture and equipment; the Owner will equitably compensate the Contractor for making any repairs to the Work that may subsequently be required due to the Owner's delivery and storage or installation of furniture and equipment.

(e) The Owner's delivery and storage or installation of furniture and equipment shall not be deemed an acceptance of any Work not completed in accordance with the requirements of the Contract Documents.

ARTICLE 34
FINAL PAYMENT

A. PREREQUISITES to FINAL PAYMENT

The following conditions are prerequisites to Final Payment becoming due the Contractor:

(1) Full execution of a Certificate of Substantial Completion for the Work, or each designated portion of the Work.

(2) Final Acceptance of the Work.

(3) The Contractor's completion, to the satisfaction of the Architect and Owner, of all documentary requirements of the Contract Documents; such as delivery of "as-built" documents, operating and maintenance manuals, warranties, etc.

(4) Delivery to the Owner of a final Application for Payment, prepared by the Contractor and approved and certified by the Architect. Architect prepares DCM Form B-13: Final Payment Checklist and forwards it to the Owner along with the final Application for Payment.

(5) Completion of an Advertisement for Completion pursuant to Paragraph C below.

(6) Delivery by the Contractor to the Owner through the Architect of DCM Form C-18: Contractor's Affidavit of Payment of Debts and Claims, and a Release of Claims, if any, and such other documents as may be required by Owner, satisfactory in form to the Owner pursuant to Paragraph D below.

(7) Consent of Surety to Final Payment, if any, to Contractor. This Consent of Surety is required for projects which have Payment and Performance Bonds.

(8) Delivery by the Contractor to the Architect and Owner of other documents, if any, required by the Contract Documents as prerequisites to Final Payment.

(9) See Manual of Procedures Chapter 7, Section L.7 concerning reconciliation of contract time, if any.

B. FINAL ACCEPTANCE of the WORK

"Final Acceptance of the Work" shall be achieved when all "punch list" items recorded with the Certificate(s) of Substantial Completion are accounted for by either: **(1)** their completion or correction by the Contractor and acceptance by the Architect, Owner, and DCM Project Inspector, or **(2)** their resolution under Article 18, Deductions for Uncorrected Work.

C. ADVERTISEMENT for COMPLETION

(1) If the Contract Sum is less than $100,000: Advertisement for Completion shall not apply to contractors performing contracts of less than $100,000.00 in amount. §39-1-1(g)

(2) If the Contract Sum is $100,000 or more: The Contractor, immediately after being notified by the Architect that all other requirements of the Contract have been completed, shall give public notice of completion of the Contract by having an Advertisement for Completion, similar to the sample contained in the Project Manual, published for a period of three weeks. The contractor can publish a notice in one or more of the following ways:

(a) In a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done.

(b) On a website that is maintained by a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done. (c) On a website utilized by the awarding authority for publishing notices.

(d) If no newspaper is published in the county in which the work was done, and if the awarding authority does not utilize a website for the purpose of publishing notices, the notice may be given by posting at the courthouse for 30 days, and proof of the posting of the notice shall be given by the awarding authority and the contractor.

Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher or website owner and a printed copy of the notice published. A final settlement shall not be made upon the contract until the expiration of 30 days after the completion of the notice.

D. RELEASE of CLAIMS

The Release of Claims and other documents referenced in Paragraph A(6) above are as follows:

(1) A release executed by Contractor of all claims and claims of lien against the Owner arising under and by virtue of the Contract, other than such claims of the Contractor, if any, as may have been previously made in writing and as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

(2) An affidavit under oath, if required, stating that so far as the Contractor has knowledge or information, there are no claims or claims of lien which have been or will be filed by any Subcontractor, Supplier or other party for labor or material for which a claim or claim of lien could be filed.

(3) A release, if required, of all claims and claims of lien made by any Subcontractor, Supplier or other party against the Owner or unpaid Contract funds held by the Owner arising under or related to the Work on the Project; provided, however, that if any Subcontractor, Supplier or others refuse to furnish a release of such claims or claims of lien, the Contractor may furnish a bond executed by Contractor and its Surety to the Owner to provide an unconditional obligation to defend, indemnify and hold harmless the Owner against any loss, cost or expense, including attorney's fees, arising out of or as a result of such claims, or claims of lien, in which event Owner may make Final Payment notwithstanding such claims or claims of lien. If Contractor and Surety fail to fulfill their obligations to Owner under the bond, the Owner shall be entitled to recover damages as a result of such failure, including all costs and reasonable attorney's fees incurred to recover such damages.

E. EFFECT of FINAL PAYMENT

(1) The making of Final Payment shall constitute a waiver of Claims by the Owner except those arising from:

- **(a)** liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- **(b)** failure of the Work to comply with the requirements of the Contract Documents;
- **(c)** terms of warranties or indemnities required by the Contract Documents, or
- **(d)** latent defects.

(2) Acceptance of Final Payment by the Contractor shall constitute a waiver of claims by Contractor except those previously made in writing, identified by Contractor as unsettled at the time of final Application for Payment, and specifically excepted from the release provided for in Paragraph D(1), above.

ARTICLE 35
CONTRACTOR'S WARRANTY

A. GENERAL WARRANTY

The Contractor warrants to the Owner and Architect that all materials and equipment furnished under the Contract will be of good quality and new, except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise, and that none of the Work will be Defective Work as defined in Article 1.

B. ONE-YEAR WARRANTY

(1) If, within one year after the date of Substantial Completion of the Work or each designated portion of the Work (or otherwise as agreed upon in a mutually-executed Certificate of Substantial Completion), any of the Work is found to be Defective Work, the Contractor shall promptly upon receipt of written notice from the Owner or Architect, and without expense to either, replace or correct the Defective Work to conform to the requirements of the Contract Documents, and repair all damage to the site, the building and its contents which is the result of Defective Work or its replacement or correction.

(2) The one-year warranty for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The one-year warranty for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion,

and other Work performed after Substantial Completion, shall begin on the date of Final Acceptance of the Work. The Contractor's correction of Work pursuant to this warranty does not extend the period of the warranty. The Contractor's one-year warranty does not apply to defects or damages due to improper or insufficient maintenance, improper operation, or wear and tear during normal usage.

(3) Upon recognizing a condition of Defective Work, the Owner shall promptly notify the Contractor of the condition. If the condition is causing damage to the building, its contents, equipment, or site, the Owner shall take reasonable actions to mitigate the damage or its continuation, if practical. If the Contractor fails to proceed promptly to comply with the terms of the warranty, or to provide the Owner with satisfactory written verification that positive action is in process, the Owner may have the Defective Work replaced or corrected and the Contractor and the Contractor's Surety shall be liable for all expense incurred.

(4) Year-end Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one-year warranty period(s). The inspection must be scheduled with the Owner, Architect and DCM Inspector. The subsequent delivery of the Architect's report of a Year-end Inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period.

(5) The Contractor's warranty of one year is in addition to, and not a limitation of, any other remedy stated herein or available to the Owner under applicable law.

C. GENERAL CONTRACTOR'S ROOFING GUARANTEE

(1) In addition to any other roof related warranties or guarantees that may be specified in the Contract Documents, the roof and associated work shall be guaranteed by the General Contractor against leaks and defects of materials and workmanship for a period of five (5) years, starting on the Date of Substantial Completion of the Project as stated in the Certificate of Substantial Completion. This guarantee for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The guarantee for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion shall begin on the date of Final Acceptance of the Work.

(2) The "General Contractor's Roofing Guarantee" (DCM Form C-9), included in the Project Manual, shall be executed in triplicate, signed by the appropriate party and submitted to the Architect for submission with the Certificate of Substantial Completion to the Owner and the Division of Construction Management.

(3) This guarantee does not include costs which might be incurred by the General Contractor in making visits to the site requested by the Owner regarding roof problems that are due to lack of proper maintenance (keeping roof drains and/or gutters clear of debris that cause a stoppage of drainage which results in water ponding, overflowing of flashing, etc.), or damages caused by vandalism or misuse of roof areas. Should the contractor be required to return to the job to correct problems of this nature that are determined not to be related to faulty workmanship and materials in the installation of the roof, payment for actions taken by the Contractor in response to such request will be the responsibility of the Owner. A detailed written report shall be made by the General Contractor on each of these 'Service Calls' with copies to the Architect, Owner and Division of Construction Management.

D. SPECIAL WARRANTIES

(1) The Contractor shall deliver to the Owner through the Architect all special or extended warranties required by the Contract Documents from the Contractor, Subcontractors, and suppliers.

(2) The Contractor and the Contractor's Surety shall be liable to the Owner for such special warranties during the Contractor's one-year warranty; thereafter, the Contractor's obligations relative to such special warranties shall be to provide reasonable assistance to the Owner in their enforcement.

E. ASSUMPTION of GUARANTEES of OTHERS

If the Contractor disturbs, alters, or damages any work guaranteed under a separate contract, thereby voiding the guarantee of that work, the Contractor shall restore the work to a condition satisfactory to the Owner and shall also guarantee it to the same extent that it was guaranteed under the separate contract.

ARTICLE 36
INDEMNIFICATION AGREEMENT

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.

ARTICLE 37
CONTRACTOR'S and SUBCONTRACTORS' INSURANCE

(Provide entire Article 37 to Contractor's insurance representative.)

A. GENERAL

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

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

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

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

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

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

B. INSURANCE COVERAGES

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

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

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

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

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

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

(2) COMMERCIAL GENERAL LIABILITY INSURANCE

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

Coverage	Limit
.1 General Aggregate	$ 2,000,000.00 per Project
.2 Products, Completed Operations Aggregate	$ 2,000,000.00 per Project
.3 Personal and Advertising Injury	$ 1,000,000.00 per Occurrence
.4 Each Occurrence	$ 1,000,000.00

(b) Additional Requirements for Commercial General Liability Insurance:

.1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.

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

(3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

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

(b) The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA OR COMMERCIAL EXCESS LIABILITY INSURANCE

(a) Commercial Umbrella or Commercial Excess Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile

Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

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

.1 $ 5,000,000 per Occurrence

.2 $ 5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella or Commercial Excess Liability Insurance:

.1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

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

(5) BUILDER'S RISK INSURANCE

(a) The Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

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

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

(ii) Partial or complete occupancy by Owner; or

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

Exception: projects containing only abatement and/or only demolition do not require Builder's Risk insurance, unless required by the Owner. Note: projects containing any scope of work besides abatement and/or demolition require Builder's Risk insurance.

C. SUBCONTRACTORS' INSURANCE

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

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

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

D. TERMINATION of OBLIGATION to INSURE

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

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

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

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

E. WAIVERS of SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, sub-subcontractors, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to the person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work. Any provision found herein which attempts to waive or invalidate the subrogation interests of Alabama's State Insurance Fund against any party to this contract or any other person or entity is void and invalid. No such waiver is intended or made by the parties to this agreement with regard to any property insured by the State Insurance Fund.

ARTICLE 38
PERFORMANCE and PAYMENT BONDS

A. GENERAL

Upon signing and returning the Construction Contract to the Owner for final approval and execution, the Contractor shall, at the Contractor's expense, furnish to the Owner a Performance Bond and a Payment Bond (P&P Bonds), DCM Forms C-6 and C-7 as contained in the Project Manual, each in a penal sum equal to 100% of the Contract Sum. Each bond shall be on the form contained in the Project Manual, shall be executed by a surety company (Surety) acceptable to the Owner and duly authorized and qualified to make such bonds in the State of Alabama in the required amount. The P&P bonds must be signed either on the same day or after the construction contract date. Each P&P Bond shall have attached thereto a power of attorney (POA) of the signing official. The POA signature date must be the same day as the P&P Bond's signature date. All signatures must be present.

The provisions of this Article are not applicable to this Contract if the Contract Sum is less than $100,000, unless bonds are required for this Contract in the Supplemental General Conditions.

B. PERFORMANCE BOND

Through the Performance Bond, the Surety's obligation to the Owner shall be to assure the prompt and faithful performance of the Contract and Contract Change Orders. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. In case of default on the part of the Contractor, the Surety shall take charge of and complete the Work in accordance with the terms of the Performance Bond. Any reasonable expenses incurred by the Owner as a result of default on the part of the Contractor, including architectural, engineering, administrative, and legal services, shall be recoverable under the Performance Bond.

C. PAYMENT BOND

Through the Payment Bond the Surety's obligation to the Owner shall be to guarantee that the Contractor and its Subcontractors shall promptly make payment to all persons supplying labor, materials, or supplies for, or in, the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in civil actions on the Bond. Any person or entity indicating that they have a claim of nonpayment under the Bond shall, upon written request, be promptly furnished a certified copy of the Bond and Construction Contract by the Contractor, Architect, Owner, or Alabama Division of Construction Management, whomever is recipient of the request.

D. CHANGE ORDERS

The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

E. EXPIRATION

The obligations of the Contractor's performance bond surety shall be coextensive with the

contractor's performance obligations under the Contract Documents; provided, however, that the surety's obligation shall expire at the end of the one-year warranty period(s) of Article 35.

ARTICLE 39
ASSIGNMENT

The Contractor shall not assign the Contract or sublet it as a whole nor assign any moneys due or to become due to the Contractor thereunder without the previous written consent of the Owner (and of the Surety, in the case of a bonded Construction Contract). As prescribed by the Public Works Law, the Contract shall in no event be assigned to an unsuccessful bidder for the Contract whose bid was rejected because the bidder was not a responsible or responsive bidder.

ARTICLE 40
CONSTRUCTION by OWNER or SEPARATE CONTRACTORS

A. OWNER'S RESERVATION of RIGHT

(1) The Owner reserves the right to self-perform, or to award separate contracts for, other portions of the Project and other Project related construction and operations on the site. The contractual conditions of such separate contracts shall be substantially similar to those of this Contract, including insurance requirements and the provisions of this Article. If the Contractor considers such actions to involve delay or additional cost under this Contract, notifications and assertion of claims shall be as provided in Article 20 and Article 23.

(2) When separate contracts are awarded, the term "Contractor" in the separate Contract Documents shall mean the Contractor who executes the respective Construction Contract.

B. COORDINATION

Unless otherwise provided in the Contract Documents, the Owner shall be responsible for coordinating the activities of the Owner's forces and separate contractors with the Work of the Contractor. The Contractor shall cooperate with the Owner and separate contractors, shall participate in reviewing and comparing their construction schedules relative to that of the Contractor when directed to do so, and shall make and adhere to any revisions to the construction schedule resulting from a joint review and mutual agreement.

C. CONDITIONS APPLICABLE to WORK PERFORMED by OWNER

Unless otherwise provided in the Contract Documents, when the Owner self-performs construction or operations related to the Project, the Owner shall be subject to the same obligations to Contractor as Contractor would have to a separate contractor under the provision of this Article 40.

D. MUTUAL RESPONSIBILITY

(1) The Contractor shall reasonably accommodate the required introduction and storage of materials and equipment and performance of activities by the Owner and separate contractors and shall connect and coordinate the Contractor's Work with theirs as required by the Contract Documents.

(2) By proceeding with an element or portion of the Work that is applied to or performed on construction by the Owner or a separate contractor, or which relies upon their operations, the Contractor accepts the condition of such construction or operations as being suitable for the Contractor's Work, except for conditions that are not reasonably discoverable by the Contractor. If the Contractor discovers any condition in such construction or operations that is not suitable for the proper performance of the Work, the Contractor shall not proceed, but shall instead promptly notify the Architect in writing of the condition discovered.

(3) The Contractor shall reimburse the Owner for any costs incurred by a separate contractor and payable by the Owner because of acts or omissions of the Contractor. Likewise, the Owner shall be responsible to the Contractor for any costs incurred by the Contractor because of the acts or omissions of a separate contractor.

(4) The Contractor shall not cut or otherwise alter construction by the Owner or a separate contractor without the written consent of the Owner and separate contractor; such consent shall not be unreasonably withheld. Likewise, the Contractor shall not unreasonably withhold its consent allowing the Owner or a separate contractor to cut or otherwise alter the Work.
(5) The Contractor shall promptly remedy any damage caused by the Contractor to the construction or property of the Owner or separate contractors**.**

ARTICLE 41
SUBCONTRACTS

A. AWARD of SUBCONTRACTS and OTHER CONTRACTS for PORTIONS of the WORK

(1) Unless otherwise provided in the Contract Documents, when delivering the executed Construction Contract, bonds, and evidence of insurance to the Architect, the Contractor shall also submit a listing of Subcontractors proposed for each principal portion of the Work and fabricators or suppliers proposed for furnishing materials or equipment fabricated to the design of the Contract Documents. This listing shall be in addition to any naming of Subcontractors, fabricators, or suppliers that may have been required in the bid process. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any Subcontractor, fabricator, or supplier proposed by the Contractor. The issuance of the Notice to Proceed in the absence of such objection by the Owner shall constitute notice that no reasonable objection to them is made.

(2) The Contractor shall not contract with a proposed Subcontractor, fabricator, or supplier to whom the Owner has made reasonable and timely objection. Except in accordance with prequalification procedures as may be contained in the Contract Documents, through specified qualifications, or on the grounds of reasonable objection, the Owner may not restrict the Contractor's selection of Subcontractors, fabricators, or suppliers.

(3) Upon the Owner's reasonable objection to a proposed Subcontractor, fabricator, or supplier, the Contractor shall promptly propose another to whom the Owner has no reasonable objection. If the proposed Subcontractor, fabricator, or supplier to whom the Owner made reasonable objection was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be equitably adjusted by Contract Change Order for any resulting difference if the Contractor has acted promptly and responsively in this procedure.

(4) The Contractor shall not change previously selected Subcontractors, fabricators, or suppliers without notifying the Architect and Owner in writing of proposed substitute Subcontractors, fabricators, or suppliers. If the Owner does not make a reasonable objection to a proposed substitute within three working days, the substitute shall be deemed approved.

B. SUBCONTRACTUAL RELATIONS

(1) The Contractor agrees to bind every Subcontractor and material supplier (and require every Subcontractor to so bind its subcontractors and material suppliers) to all the provisions of the Contract Documents as they apply to the Subcontractor's and material supplier's portion of the Work.

(2) Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner, nor to create a duty of the Architect, Owner, or Director to resolve disputes between or among the Contractor or its Subcontractors and suppliers or any other duty to such Subcontractors or suppliers.

ARTICLE 42
ARCHITECT'S STATUS

A. The Architect is an independent contractor performing, with respect to this Contract, pursuant to an agreement executed between the Owner and the Architect. The Architect has prepared the Drawings and Specifications and assembled the Contract Document and is, therefore, charged with their interpretation and clarification as described in the Contract Documents. As a representative of the Owner, the Architect will endeavor to guard the Owner against variances from the requirements of the Contract Documents by the Contractor. On behalf of the Owner, the Architect will administer the Contract as described in the Contract Documents during construction and the Contractor's one-year warranty.

B. So as to maintain continuity in administration of the Contract and performance of the Work, and to facilitate complete documentation of the project record, all communications between the Contractor and Owner regarding matters of or related to the Contract shall be directed through the Architect, unless direct communication is otherwise required to provide a legal notification. Unless otherwise authorized by the Architect, communications by and with the Architect's consultants shall be through the Architect. Unless otherwise authorized by the Contractor, communications by and with Subcontractors and material suppliers shall be through the Contractor.

C. ARCHITECT'S AUTHORITY

Subject to other provisions of the Contract Documents, the following summarizes some of the authority vested in the Architect by the Owner with respect to the Construction Contract and as further described or conditioned in other Articles of these General Conditions of the Contract.

(1) The Architect is authorized to:

- **(a)** approve "minor" deviations as defined in Article 9, Submittals,
- **(b)** make "minor" changes in the Work as defined in Article 19, Changes in the Work,
- **(c)** reject or require the correction of Defective Work,
- **(d)** require the Contractor to stop the performance of Defective Work,
- **(e)** adjust an Application for Payment by the Contractor pursuant to Article 30, Certification

and Approval of payments, and
(f) issue Notices to Cure pursuant to Article 27.

(2) The Architect is not authorized to:
(a) revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations and changes) without concurrence of the Owner,
(b) finally approve or accept any portion of the Work without concurrence of the Owner,
(c) issue instructions contrary to the Contract Documents,
(d) issue Notice of Termination or otherwise terminate the Contract, or
(e) require the Contractor to stop the Work except only to avoid the performance of Defective Work.

D. LIMITATIONS of RESPONSIBILITIES

(1) The Architect shall not be responsible to Contractors or to others for supervising or coordinating the performance of the Work or for the Construction Methods or safety of the Work, unless the Contract Documents give other specific instructions concerning these matters.
(2) The Architect will not be responsible to the Contractor (nor the Owner) for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents or for acts or omissions of the Contractor, a Subcontractor, or anyone for whose acts they may be liable. However, the Architect will report to the Owner and Contractor any Defective Work recognized by the Architect.

(3) The Architect will endeavor to secure faithful performance by Owner and Contractor, and the Architect will not show partiality to either or be liable to either for results of interpretations or decisions rendered in good faith.

(4) The Contractor's remedies for additional time or expense arising out of or related to this Contract, or the breach thereof, shall be solely as provided for in the Contract Documents. The Contractor shall have no claim or cause of action against the Owner, Architect, or its consultants for any actions or failures to act, whether such claim may be in contract, tort, strict liability, or otherwise, it being the agreement of the parties that the Contractor shall make no claim against the Owner or any agents of the Owner, including the Architect or its consultants, except as may be provided for claims or disputes submitted in accordance with Article 24. The Architect and Architect's consultants shall be considered third party beneficiaries of this provision of the Contract and entitled to enforce same.

E. ARCHITECT'S DECISIONS

Decisions by the Architect shall be in writing The Architect's decisions on matters relating to aesthetic effect will be final and binding if consistent with the intent expressed in the Contract Documents. The Architect's decisions regarding disputes arising between the Contractor and Owner shall be advisory.

ARTICLE 43
CASH ALLOWANCES

A. All allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by allowances shall be supplied by the Contractor as directed by the Architect or Owner

and the Contractor shall afford the Owner the economy of obtaining competitive pricing from responsible bidders for allowance items unless other purchasing procedures are specified in the Contract Documents.

B. 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, 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.

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

ARTICLE 44
PERMITS, LAWS, and REGULATIONS

A. PERMITS, FEES AND NOTICES

(1) Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work which are customarily secured after award of the Construction Contract and which are in effect on the date of receipt of bids.

(2) The Contractor shall comply with and give notices required by all laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

B. TAXES

Unless stated otherwise in the Contract Documents, materials incorporated into the Work are exempt from sales and use tax pursuant to Section 40-9-33, Code of Alabama, 1975 as amended. The Owner, Contractor and its subcontractors shall be responsible for complying with rules and regulations of the Sales, Use, & Business Tax Division of the Alabama Department of Revenue regarding certificates and other qualifications necessary to claim such exemption when making qualifying purchases from vendors. The Contractor shall pay all applicable taxes that are not covered by the exemption of Section 40-9-33 and which are imposed as of the date of receipt of bids, including those imposed as of the date of receipt of bids but scheduled to go into effect after that date.

C. COMPENSATION for INCREASES

The Contractor shall be compensated for additional costs incurred because of increases in tax rates imposed after the date of receipt of bids.

D. ALABAMA IMMIGRATION LAW

Per ACT 2011-535 as codified in Title 31, Chapter 13 of the Code of Alabama, 1975, as amended:

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.

E. ALABAMA TRADE BOYCOTT LAW

Per Act 2016-312as codified in Title 41, Chapter 16, Article 1, of the Code of Alabama, 1975, as amended:

The contracting parties affirm, for the duration of the agreement, that they are 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.

EE. ALABAMA ECONOMIC BOYCOTT LAW

Per Act 2023-409 as codified in Title 41, Chapter 16, Article 1 of the Code of Alabama, 1975, as amended:

The contracting parties affirm, for the duration of the agreement, that they are not currently engaged in, and will not engage in, economic boycotts.

F. ACCOUNTING OF SALES TAX EXEMPT PROJECTS

Per Act 2013-205 as codified in Title 40, Chapter 9, Article 1, of the Code of Alabama, 1975, as amended:

In bidding the work on a tax exempt project, the bid form shall provide an accounting for the tax savings.

ARTICLE 45
ROYALTIES, PATENTS, and COPYRIGHTS

The Contractor shall pay all royalties and license fees. 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 from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of, related to, or resulting from all suits or claims for infringement of any patent rights or copyrights arising out of the inclusion of any patented or copyrighted materials, methods, or systems selected by the Contractor and used during the execution of or incorporated into the Work. This indemnification does not apply to any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods, or systems specified in the Contract Documents. However, if the Contractor has information that a specified material, method, or system is or may constitute an

infringement of a patent or copyright, the Contractor shall be responsible for any resulting loss unless such information is promptly furnished to the Architect.

ARTICLE 46
USE of the SITE

A. The Contractor shall confine its operations at the Project site to areas permitted by the Owner and by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials, equipment, employees' vehicles, or debris. The Contractor's operations at the site shall be restricted to the sole purpose of constructing the Work, use of the site as a staging, assembly, or storage area for other business which the Contractor may undertake shall not be permitted.

B. Unless otherwise provided in the Contract Documents, temporary facilities, such as storage sheds, shops, and offices may be erected on the Project site with the approval of the Architect and Owner. Such temporary buildings and/or utilities shall remain the property of the Contractor, and be removed at the Contractor's expense upon completion of the Work, unless the Owner authorizes their abandonment without removal.

ARTICLE 47
CUTTING and PATCHING

A. The Contractor shall be responsible for all cutting, fitting, or patching that may be required to execute the Work to the results indicated in the Contract Documents or to make its parts fit together properly.

B. Any cutting, patching, or excavation by the Contractor shall be supervised and performed in a manner that will not endanger persons nor damage or endanger the Work or any fully or partially completed construction of the Owner or separate contractors.

ARTICLE 48
IN-PROGRESS and FINAL CLEANUP

A. IN-PROGRESS CLEAN-UP

(1) The Contractor shall at all times during the progress of the Work keep the premises and surrounding area free from rubbish, scrap materials and debris resulting from the Work. 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 window openings. Burning of trash and debris on site is not permitted.

(2) The Contractor shall make provisions to minimize and confine dust and debris resulting from construction activities.

B. FINAL CLEAN-UP

(1) Before Substantial Completion or Final Acceptance is achieved, the Contractor shall have removed from the Owner's property all construction equipment, tools, and machinery; temporary structures and/or utilities including the foundations thereof (except such as the Owner permits in writing to remain); rubbish, debris, 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.

(2) In addition to the above, and unless otherwise provided in the Contract Documents, the Contractor shall be responsible for the following special cleaning for all trades as the Work is completed:

(a) Cleaning of all painted, enameled, stained, or baked enamel work: Removal of all marks, stains, finger prints 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 same on interior and exterior.

(c) Cleaning or polishing of all hardware: Cleaning and polishing of all hardware.

(d) Cleaning all tile, floor finish of all kinds: Removal of all splatters, stains, paint, dirt, and dust, the washing and polishing of all floors as recommended by the manufacturer or required by the Architect.

(e) Cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: Removal of all stickers, rust stains, labels, and temporary covers, and 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 Architect; blowing out or flushing out of all foreign matter from all equipment, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers, sanitizing potable water systems; and freeing identification plates on all equipment of excess paint and the polishing thereof.

C. OWNER'S RIGHT to CLEAN-UP

If the Contractor fails to comply with these clean-up requirements and then fails to comply with a written directive by the Architect to clean-up the premises within a specified time, the Architect or Owner may implement appropriate clean-up measures and the cost thereof shall be deducted from any amounts due or to become due the Contractor.

ARTICLE 49
LIQUIDATED DAMAGES

A. Time is the essence of the Contract. Any delay in the completion of the Work required by the Contract Documents may cause inconvenience to the public and loss and damage to the Owner including but not limited to interest and additional administrative, architectural, inspection and supervision charges. By executing the Construction Contract, the Contractor agrees that the Contract Time is sufficient for the achievement of Substantial Completion.

B. The Contract Documents may provide in the Construction Contract or elsewhere for a certain dollar amount for which the Contractor and its Surety (if any) will be liable to the Owner as liquidated damages for each calendar day after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work. If such daily liquidated damages are provided for, Owner and Contractor, and its Surety, agree that such amount is reasonable and agree to be bound thereby.

C. If a daily liquidated damage amount is not otherwise provided for in the Contract Documents, a time charge equal to six percent interest per annum on the total Contract Sum may be made against the Contractor for the entire period after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work.

D. The amount of liquidated damages due under either paragraph B or C, above, may be deducted by the Owner from the moneys otherwise due the Contractor in the Final Payment, not as a penalty, but as liquidated damages sustained, or the amount may be recovered from Contractor or its Surety. If part of the Work is substantially completed within the Contract Time and part is not, the stated charge for liquidated damages shall be equitably prorated to that portion of the Work that the Contractor fails to substantially complete within the Contract Time. It is mutually understood and agreed between the parties hereto that such amount is reasonable as liquidated damages.

ARTICLE 50
USE of FOREIGN MATERIALS

A. In the performance of the Work the Contractor agrees to use 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 the Public Works Law.

B. In the performance of the Work the Contractor agrees to use iron or steel, that are made a permanent part of the structure, produced in the United States if the Contract Documents require the use of iron or steel and do not limit its supply to a sole source pursuant to the Public Works Law. If the Owner decides that the procurement of domestic steel products becomes impractical as a result of national emergency, national strike, or other cause, the Owner shall waive this restriction.

C. If domestic steel or other domestic materials, supplies, and products are not used in accordance with preceding Paragraphs A and B, the Contract Sum shall be reduced by an amount equal to any savings or benefits realized by the Contractor.

D. This Article applies only to Public Works projects financed entirely by the State of Alabama or any political subdivision of the state.

ARTICLE 51
PROJECT SIGN

A. Fully locally-funded State Agency and Public Higher Education projects: DCM Form C-15: Detail of Project Sign must be included in the project manual regardless of expected bid amount. If the awarded contract sum is $100,000.00 or more, Contractor shall furnish and erect a project sign. Other conditions besides the contract sum may warrant waiver of this requirement, but only with approval of the Technical Staff.

B. Fully locally-funded K-12 school projects: Project sign is not required unless requested by Owner; if project sign is requested by Owner, include DCM Form C-15: Detail of Project Sign in the project manual.

C. Partially or fully PSCA-funded projects: DCM Form C-15: Detail of Project Sign must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of the contract sum. "Alabama Public School and College Authority" as well as the local owner entity must be included as awarding authorities on the project sign of all PSCA-funded projects.

When required per the above conditions, the project sign shall be erected in a prominent location selected by the Architect and Owner and shall be maintained in good condition until completion of Work. If the Contract involves Work on multiple sites, only one project sign is required, which shall be erected on one of the sites in a location selected by the Architect and Owner. Slogan: The title of the current PSCA Act should be placed on the project sign of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.

END of
GENERAL CONDITIONS of the CONTRACT

SUPPLEMENT TO THE GENERAL CONDITIONS OF THE CONTRACT

1.1 The following supplements shall modify, delete and/or add to the General Conditions of the Contract. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided or superseded shall remain in effect.

A. **Refer to Article 2.A; Definition**:

1. Architect: Construction documents for this project have been developed by Lathan Mckee , Architects, 631 South Hull Street, Montgomery, Alabama, 36104, (334) 834-9933 `commissioned by the Owner.
2. Owner: Saraland City Schools. Unless otherwise stated, all papers required to be delivered to the Owner shall be forwarded through the Architect.

B. **Refer to Article 3:**

1. Add the following:
    a. **Contractor's Qualification's:** The Roofing Contract shall possess the following, or stringent, minimum qualifications: the roofing contractor must be a firm of not less than five (5) years of successful experience in installation of roof systems similar to those specified for the project and which is acceptable to or licensed by the manufacturer of the primary roofing materials.
    b. **Manufacturer's Qualifications:** In specifying acceptable manufacturers or minimum quality qualifications of manufacturers, the following, or more stringent criteria should be used: The manufacturer shall have a minimum of five (5) years of experience in the manufacture of the roofing system and must also be the **original material manufacturer** of the primary roofing material.

C. **Refer to Article 6**;

1. Add the following to Paragraph B:
    a. The lowest bidding Contractor shall submit to the Architect within five (5) calendar days after the bid date the name(s) of the Superintendent(s) who will be in charge at the work site, along with the qualifications and experience.
    b. NOTE: By submission of a Proposal the Bidder agrees that the Owner or Architect may reject a proposed Superintendent with or without a stated reason with no recourse to the Contractor.

D. **Refer to Article 6;**

1. Add the following to Paragraph C:
    a. All labor shall be performed in the best and most workmanlike manner by persons skilled in their respective assignments or trades. Workmen whose work is unsatisfactory to the Architect or the Owner, or who are considered unfit or unskilled, or otherwise objectionable, shall be dismissed upon notice from the Architect or Owner.

E. **Refer to Article 9, Paragraph D**;

1. Add the following:
    a. All submittals for color selections, to be made by the Architect for the entire project shall be submitted at the same time within 45 days from the "Notice to Proceed". Piece-meal submittals for color selection will not be permitted.
    b. Provide as follows unless otherwise specified:

1) All submittals shall be sent to the Architect no later **than 45 calendar days** from "**Notice To Proceed**" to: **Submittal Exchange subex-sales_ww@oracle.com** if applicable. A **Submittal Log** must accompany each submittal.

2) Refer to Article 41, paragraph A "Subcontracts", section (1):
1. As required by the Supplemental General Conditions, the Contractor must provide the total cost for each of the following divisions:
a. Civil
b. Plumbing
c. Mechanical
d. Electrical
e. These submissions shall have the above requested costs and Architectural Project Number provided in a single document and emailed prior to the full execution of the project.

3) For projects requiring the use of Submittal Exchange, logs for the project shall be set up to mimic the Architectural Project numbered 22-192 and must include the following:

- Submittal
- Closeout
- RFI
- RFP
- ASI
- Meeting Minutes
- * Drawings
- * Photos
- * Punchlist/Issue Management
- * COR
- * Pay Application

F. **Refer to Article 13;**

1. Add the following:

a. "If the bidder desires to substitute an "equal", he must secure written approval by the Architect of qualification to bid ten (10) days prior to date.

b. On all items specified as or equal substitutions must be submitted to the Architect ten (10) days prior to bid opening and Architect will act on substitution five (5) days prior to bids and notify all Contractors.

c. The request for substitutions are to be filled out completely and must be received prior to bid. Any subcontractor and/or material supplier that was not "approved" and their price is used at bid time will be the Contractors problem to absorb any cost associated with the use of a "non-approved material or equipment. If the "approval" is not listed in the addendum, then the "approval" is not accepted.

G. **Refer to Article 15**:

1. The General Contractor shall be solely responsible for all requirements under this Article.

H. **Refer to Article 16:**

2. Add the following: Article 16; General, (5)

a. **Single-Ply Roofs:** Should design or economic restrictions require the use of a single-ply elastomeric roofing system, ballasted systems of any type should be avoided.

b. **Interior Gutters:** The use of interior gutters should be avoided at all times.

c. **Protection During Application:** At no time during construction should the surface of the asphalt or coal tar pitch roofing system to be left unprotected. A glaze coat of asphalt or pitch must be applied to the surface of the membrane if the top pour or cap sheet cannot be applied during the same day.

d. **Contractor's Qualification's:** The Roofing Contract shall possess the following, or stringent, minimum qualifications: the roofing contractor must be a firm of not less than five (5) years of successful experience in installation of roof systems similar to those specified for the project and which is acceptable to or licensed by the manufacturer of the primary roofing materials.

e. **Manufacturer's Qualifications:** In specifying acceptable manufacturers or minimum quality qualifications of manufacturers, the following, or more stringent criteria should be used: The manufacturer shall have a minimum of five (5) years of experience in the manufacture of the roofing system and must also be the **original material manufacturer** of the primary roofing material.

I. Refer to Article 19:

1. In conjunction with Division of Construction Management Change Order documents provide all data required for Lathan Mckee Architects Form 0825 when submitting a Change Order Proposal

J. **Refer to Article 29, PROGRESS PAYMENTS,** paragraph "B", Schedule of Values:

1. Amend Paragraph as follows:
   a. "Within ten days after receiving the Notice to Proceed the contractor shall submit to the Architect a DCM Form C-10SOV, Schedule of Values, which is a breakdown of the Contract Sum showing the value '**and category of Work with Subcontractor name(s)'** of the various parts of the Work for billing purposes."
2. Add the following:
   a. The Contractor shall list the Category of Work with the Subcontractor name(s) attributable to each line item value in the column "B", "Description of Work" line(s) of the DCM Form C-10SOV, Schedule of Values.
3. Add the following:
   a. Values shall be broken down within principal contracts in amounts not greater than $30,000, but in no case greater than 5 percent of the Contract Sum.

K. **Refer to Article 32, SUBSTANTIAL COMPLETION**

1. Add the following:
   a. All manufacturers' warranties shall commence on the date as set forth on the Substantial Completion Form, no exceptions.
   b. Contractor shall furnish to the Architect a written letter of "notification" that all "Punch List" items have been completed prior to re-inspection.

L. **Refer to Article 35**, paragraph "D", Special Warranties:

1. Change as follows:
   a. The Contractor shall deliver to the Owner through the Architect all special or extended warranties required by the Contract Documents from the Contractor, Subcontractors, and suppliers.

M. **Refer to Article 37**:

1. The Architect shall not be liable for any damage or injury to property or any person or persons arising from the presence of/or effects of any hazardous materials or hazardous elements in any state of form in connection with the work under this Contract. All such liability shall lie with the Contractor.

N. **Refer to Article 44**;

1. Add the following: All work on this project shall be performed in accordance with the following codes:
   a. 2010 ADA Standards For Accessible Design
   b. 2021 International Building Code
   c. 2021 International Plumbing Code
   d. 2021 International Mechanical Code
   e. 2021 International Fuel Gas Code
   f. 2021 International Fire Code

g. 2020 National Electrical Code

h. 2019 National Fire Alarm and Signaling Code

i. ANSI/ASHRAE/IESNA Standard 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential

O. **Refer to Article 49**:

1. Liquidated damages will be assessed at a rate of 6% per annum.
2. If this contract extends thirty (30) days past Schedule Completion Date, Owner shall deduct from the Contractor's final payment, a sum equal to the additional expense incurred by the Owner for the Architect for contract administration past scheduled completion date.

END OF SECTION

State of Alabama

Disclosure Statement

(Required by Act 2001-955)

ENTITY COMPLETING FORM

ADDRESS

CITY, STATE, ZIP

TELEPHONE NUMBER ( )

STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD

ADDRESS

CITY, STATE, ZIP

TELEPHONE NUMBER ( )

This form is provided with:

☐ Contract ☐ Proposal ☐ Request for Proposal ☐ Invitation to Bid ☐ Grant Proposal

Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously provided, and the amount received for the provision of such goods or services.

STATE AGENCY/DEPARTMENT	TYPE OF GOODS/SERVICES	AMOUNT RECEIVED

Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant.

STATE AGENCY/DEPARTMENT	DATE GRANT AWARDED	AMOUNT OF GRANT

1. List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF PUBLIC OFFICIAL/EMPLOYEE	ADDRESS	STATE DEPARTMENT/AGENCY

OVER

2. List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

NAME OF FAMILY MEMBER	ADDRESS	NAME OF PUBLIC OFFICIAL/ PUBLIC EMPLOYEE	STATE DEPARTMENT/ AGENCY WHERE EMPLOYED

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

NAME OF PAID CONSULTANT/LOBBYIST	ADDRESS

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. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed $10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature Date

Notary's Signature Date Date Notary Expires

Act 2001-955 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of $5,000.

STATE OF ALABAMA
DEPARTMENT OF FINANCE
REAL PROPERTY MANAGEMENT
Division of Construction Management

Kay Ivey
Governor

Bill Poole
Director of Finance

P.O. Box 301150, Montgomery, AL 36130-1150
770 Washington Avenue, Suite 444, Montgomery, AL 36104
Telephone: (334) 242-4082 Fax: (334) 242-4182

Mickey Allen
Assistant Finance Director
Real Property Management

Frank Barnes, Director
Construction Management

E-Verify Memorandum of Understanding

Instructions for inclusion in project manuals.

Per DCM's May 29, 2012 bulletin *Guidance on Act 2012-491 Amending the Alabama Immigration Law*: "Contractors (including architects and engineers) will … be required to enroll in the E-Verify program and to provide documentation of enrollment in the E-Verify program with their contracts or agreements."

Upon completing enrollment in the E-Verify program available at https://www.e-verify.gov/employers/enrolling-in-e-verify, an E-Verify Memorandum of Understanding (MOU) is issued to the enrolled business. The same E-Verify MOU can be repeatedly used until any information in the business's E-Verify user profile is updated, at which time E-Verify updates the printable Company Information section of the MOU, while the original signatory information remains the same. Typically, an E-Verify MOU is 13-18 pages long depending on business type and number of employees.

DCM requires a copy of the entire current E-Verify MOU document including the completed Department of Homeland Security – Verification Division section (with name, signature and date included) to be submitted as an attachment to each Construction Contract original and to each Agreement Between Owner and Architect original.

Supplemental E-Verify Memorandum of Understanding

Contractors (including architects and engineers) will be required to enroll in the E-Verify program and to provide documentation of enrollment in the E-Verify program with their contracts or agreements per Alabama Immigration Law.

McKee and Associates Architects requires a copy of the entire current E-Verify MOU document including the completed Department of Homeland Security – Verification Division section (with name, signature and date included) to be submitted as an attachment to each Construction Contract original and to each Agreement Between Owner and Architect original.

Refer to State of Alabama E-Verify Memorandum of Understanding Instructions (Revised August 2021) with ABC Bulletin (May 29, 2012) and Revised Alabama Immigration Law Guidance for School Boards (Revised May 2012).

ST: EXC-01
11/23

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

Application For
Sales and Use Tax Certificate of Exemption

FOR GOVERNMENT ENTITY PROJECT

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

PROJECT INFORMATION:

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

APPLICANT'S INFORMATION:

RELATION: *(CHOOSE ONE)*

☐ Government Entity ☐ Statutorily Exempt Entity ☐ General Contractor ☐ Subcontractor

APPLICANT'S LEGAL NAME				FEIN
DBA				CONSUMER'S USE TAX ACCOUNT NUMBER
MAILING ADDRESS: STREET	CITY	STATE	ZIP	COUNTY

CONTACT PERSON	BUSINESS TELEPHONE NUMBER
	( )

EMAIL ADDRESS

PROJECT START DATE	PROJECT END DATE

WILL THE APPLICANT HAVE ANY SUBCONTRACTORS ON THIS JOB?	NAME OF PARTY TO THE CONTRACT
☐ Yes ☐ No If yes, please attach list.	

JOB DESCRIPTION

WILL ANY POLLUTION CONTROL EXEMPTION BE APPLICABLE?	ESTIMATED POLLUTION CONTROL COST
☐ Yes ☐ No	$

TOTAL PROJECT BID AMOUNT (APPLICANT'S PORTION OF PROJECT)	LABOR COST (APPLICANT'S PORTION OF PROJECT)	MATERIAL COST (APPLICANT'S PORTION OF PROJECT)
$	$	$

REVENUE DEPARTMENT USE ONLY

PENDING DOCUMENTATION / INFORMATION:

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

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

PROJECT NAME	PROJECT OWNER'S FEIN (EXEMPT ENTITY)

FORM OF OWNERSHIP:

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

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

OWNERSHIP INFORMATION:

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

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

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

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

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

NAME *(PLEASE PRINT)* _____ SIGNATURE _____

TITLE _____ DATE _____

REVENUE DEPARTMENT USE ONLY

PENDING OTHER:

☐ Government Entity ☐ General Contractor ☐ Not on LOS

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

Examiner's Remarks _____

Examiner _____ Date _____

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

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

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

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

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

Subcontractor:
1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. List of Subcontractors (if any)

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

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

Fax: (334) 353-7867

Email: STContractorsExempt@revenue.alabama.gov

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

Revised October 2025

ALABAMA DEPARTMENT OF FINANCE
REAL PROPERTY MANAGEMENT
Division of Construction Management

www.dcm.alabama.gov, 334-242-4082, inspections@rpm.alabama.gov

Department Use Only
Invoice # _____

PERMIT FEE CALCULATON WORKSHEET

DCM # _____ Date _____

Project Name; Owner/Architect/Engineer Project # & Phase/Package # _____

_____

Owner Entity Name _____

Architect/Engineer Firm Name _____

Contractor Company Name _____

Awarded Contract Sum: _____

Email address(es) for Payment Receipt: _____

BASIC PERMIT FEE CALCULATION:

Awarded Contract Sum up to $100,000 $200.00 fee

Awarded Contract Sum is $100,001 - $250,000 $400.00 fee

Awarded Contract Sum is $250,001 - $1,000,000

Contract Sum less $250,000= _____/1,000 x $0.80 + $200.00=_____ x 2 = _____

Awarded Contract Sum is $1,000,001 - $10,000,000

Contract Sum less $1,000,000= _____/1,000 x $0.60 + $800.00=_____ x 2 = _____

Awarded Contract Sum is $10,000,001 - $50,000,000

Contract Sum less $10,000,000= _____/1,000 x $0.40 + $6,200.00=_____ x 2 = _____

Awarded Contract Sum is $50,000,001 and up

Contract Sum less $50,000,000= _____/1,000 x $0.20 + $22,200.00=_____ x 2 = _____

TOTAL DUE: _____

Permit fees are not owed for fully locally funded K-12 and 4-year public University projects for capital improvement or alterations with estimated cost of $750,000.00 or Less. Determination of whether a project is subject to the Locally-Funded $750,000.00 or Less exception for inspections is based on the total of bids received for all phases and bid packages for the project. Inspections are still required for such projects.

Basic Permit Fee: Covers all required pre-construction conferences, construction inspections and certificate of substantial completion issuance by the DCM Inspector. This fee is due when a construction contract or self-performance letter is received by DCM and must be paid before the required Pre-Construction Conference is scheduled with the DCM Inspector.

Permit Re-Inspection Fee: A fee of $1,500.00 per occurrence may be charged if (A) the contractor has not completed the work required for the particular inspection as detailed in DCM Form B-8: Pre-Construction Conference Checklist, or (B) the inspection is canceled or rescheduled without the required minimum 48 hours notice to all parties.

Make check payable to: "Finance - Construction Management", include the DCM Project # on the check and attach the fee worksheet. Mail payment to: Finance - Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150.

State agency inter-fund transfer and payments using Public School and College Authority (PSCA) funds: contact Jennie Jones at 334-242-4808 or jennie.jones@rpm.alabama.gov.

Fees may be paid online at www.dcm.alabama.gov (in which case a completed fee worksheet is not required). The Basic Permit Fee is subject to Final Reconciliation of Fees at the end of construction.

The Basic Permit Fee is subject to Final Reconciliation of Fees at the end of construction.

Alabama Department of Finance
Real Property Management
Division of Construction Management
770 Washington Avenue, Suite 444
Montgomery, AL 36104
(334) 242-4082, inspections@rpm.alabama.gov

DCM Form B-8
Revised October 2025

PRE-CONSTRUCTION CONFERENCE CHECKLIST

The following are recommended topics to be covered during the required Pre-Construction Conference. Contact the DCM Project Inspector via DCM's Engage Portal at least fourteen (14) days prior to scheduling the conference.

**Shall be discussed while owner is present*

	*1. Name and relationship to job of local Owner personnel
	2. Public officials involved
	3. Names of architect/engineer personnel involved
	4. Provide e-mail addresses on Pre-Construction Sign-in sheet
	5. Construction sets of plans available to contractor
	6. Verify alternates accepted, etc.
	7. Approved list of sub-contractors
	*8. Point of contact for project. Project Manager _____ Job Superintendent _____
	9. Approved cost breakdown (DCM Form C-10SOV) & Progress Schedule (DCM Form C-11)
	*10. Method of approving monthly payment requests • All State Agency, PSCA-funded University, and PSCA-funded K-12 projects: payment applications must be submitted via DocuSign PowerForm links available from DCM's Engage Portal. • Fully locally-funded University and fully locally-funded K-12 projects: submit payment applications per Owner requirements.
	*11. Time Extensions
	*12. Overall phasing of job
	13. Project limits
	14. Shop drawings, time to process
	*15. Sales tax savings (Alabama Department of Revenue)
	*16. Project sign and other job signs
	17. ADEM permit, if more than one acre of land is disturbed. • Coordinate offsite storm water drainage with the authority having jurisdiction when applicable.
	18. DCM Inspection Minimum Requirements.
	19. Advance notice for required DCM inspections The contractor will notify the architect by email of the date the project will be ready for an inspection by the Division of Construction Management. Inspections must be requested via DCM's Engage Portal 14 days in advance. When the DCM Inspector confirms the inspection date and time, the architect will send an email confirming the inspection date and time to all parties as well as a copy to inspections@rpm.alabama.gov. An Outlook calendar invite is also suggested for all inspections. Cancellations of any scheduled inspection must be received in writing no later than 48 hours prior to the scheduled inspection. If the inspection is canceled, it will be rescheduled subject to the DCM Inspector's availability. Cancellations received less than 48 hours in advance shall incur a $1,500.00 re-inspection fee. If the project is not ready for the scheduled inspection, the General Contractor shall incur a $1,500.00 re-inspection fee.

20. Pre-Construction Conference: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Major Subs
    - Fully-executed construction contract and Notice to Proceed
    - Verification of permit fee payment (Exception: fully locally-funded K-12 & public four-year University capital improvement, HVAC, or roof projects with an estimated cost of $750,000.00 or Less, are exempt from DCM Fees.)
    - Fire alarm contractor and fire sprinkler contractor certification (from State Fire Marshal)
    - ADEM permit, if more than one acre of land is disturbed.
    - The General Contractor to perform and furnish all work, labor, services, supervision, materials, equipment, tools, scaffolds, appliances, insurance, taxes, and other things necessary to complete the work in strict accordance with all plans, specifications, and GENERAL CONDITIONS. The Contractor shall be liable for any omissions in contractors bid proposal or any other interpretations made by contractor. All items of Work related to each are to be provided so that no gaps, omissions, or conflicts arise that prevents a complete and functioning result.
    - Contractor's duty to coordinate work of separate contractors.

21. Pre-Construction Conference for Storm Shelter: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Structural Engineer, Major Subs, Special Inspections Representative
    - The completed & signed DCM Form B-15: Owner's Statement of Responsibility for Tornado Storm Shelter (Hurricane Shelter Where Applicable) must be submitted to the DCM Inspector at Pre-Construction Conference. Must be kept with Owner's storm shelter records.
    - The completed & signed DCM Form C-17: Contractor's Statement of Responsibility for Construction of Tornado Storm Shelter (Hurricane Shelter Where Applicable) along with required Quality Assurance Plan (QAP) must be submitted to DCM Inspector at Pre-Construction Conference.
    - The completed and signed DCM Form B-14: Certification of Structural Observations from the Structural Engineer of Record must be attached to the Certificate of Substantial Completion form via DocuSign link available from DCM's Engage Portal.
    - Storm Shelter Impact-protective systems Listing and labeling: Impact-protective systems shall be listed and labeled.
      Marking: The following function and performance characteristics shall be provided on the label for each impact protective system tested:
      1. Manufacturer’s identification reference or listing number for the assembly.
      2. Type of impact-protective system, such as window assembly, door assembly shutter assembly or louver.
      3. Hazard: hurricane, tornado, or both.
      4. Missile weight and speed.
      5. Design wind pressure.
      6. Edition of ICC 500.

22. Pre-Roofing Conference: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Roofing Sub, Roofing Manufacturer’s Representative
    - This conference shall be conducted by the design professional as described in Chapter 5, Section C.4 of the DCM Manual of Procedures.
    - Roofing submittals must be approved by the architect prior to pre-roofing conference.
    - Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance.
    - Copy of sample roof warranty – Note: Standard manufacturer's roofing guarantees which contain language regarding the governing of the guarantee by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the Laws of the State of Alabama shall govern all such guarantees.
    - Contractor shall video existing building interior and exterior prior to roofing operations and provide copy to owner.
    - General Contractor’s Roofing Guarantee and Manufacturer’s Roofing Warrantees must be presented to DCM Inspector at Final Inspection and submitted with Certificate of Substantial Completion for all projects via DocuSign PowerForm links available from DCM’s Engage Portal.

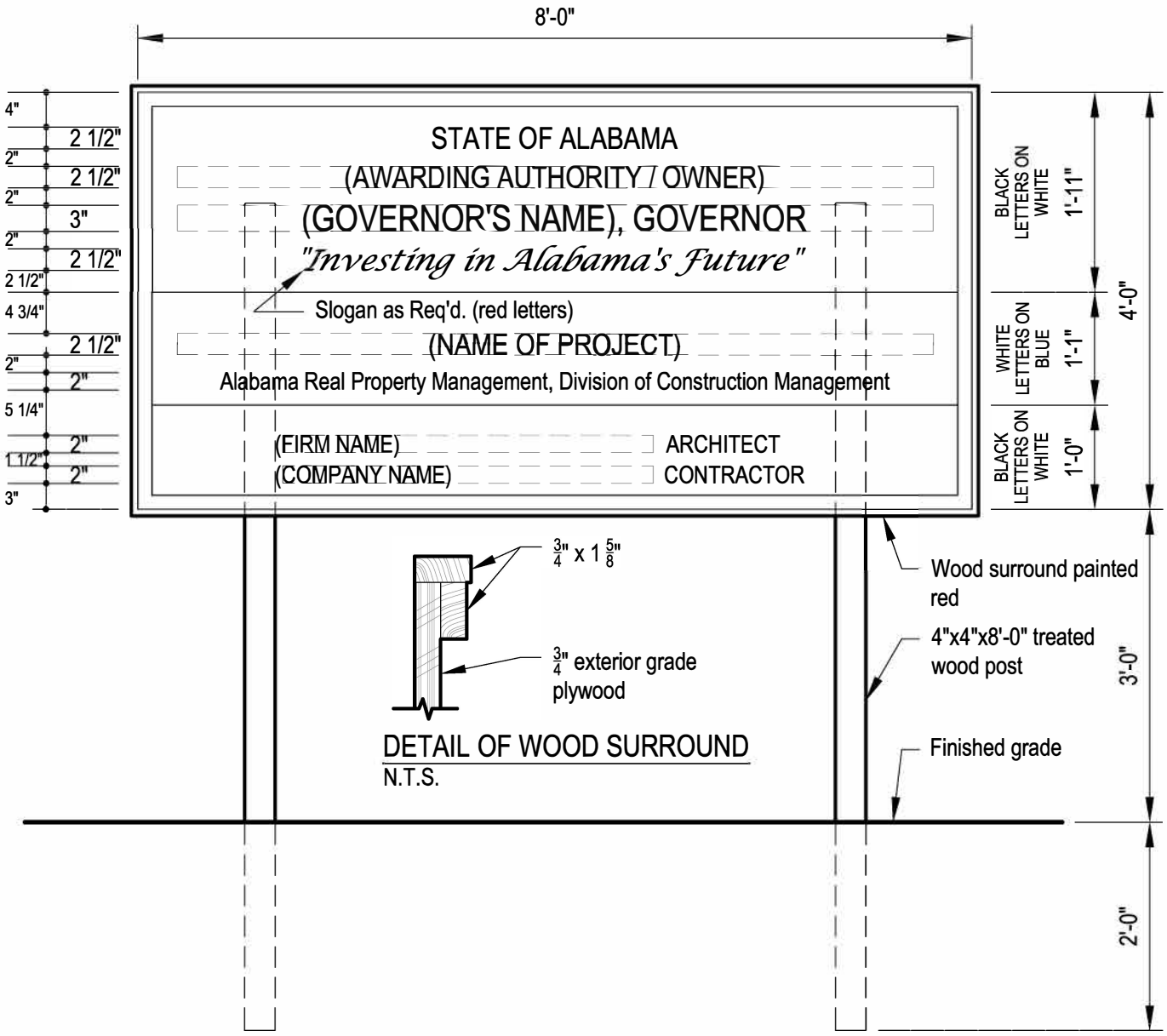
	23. Above Ceiling Inspections: Required Attendees: DCM Inspector, Contractor, Owner, Architect, MEP Engineers, Major Subs • All work must be completed except for installation of ceiling tiles, and/or hard ceilings. • Space must be conditioned. • Permanent power must be connected unless otherwise arranged with the DCM Inspector. • Grease duct must be inspected and approved by the DCM Inspector prior to fire wrapping and above-ceiling inspection.
	24. Life Safety Inspections and Final Inspection: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Engineers, Major Subs, Local Fire Marshal • Fire alarm certification • Kitchen hood fire suppression system certification • General contractor's 5-year roofing guarantee (DCM Form C-9) • Roofing manufacturer's warranty • Above ground and below ground sprinkler certifications • Completed certificate of structural engineer's observations (for storm shelter) • Emergency and exit lighting tests. • Fire alarm must be monitored. • Elevator inspection completed and certificate of operation provided by the State of Alabama Department of Labor • Boiler/vessels inspection completed, and certificate of operation provided by the State of Alabama Department of Labor • Pressure test/Flush test for underground sprinkler lines (witnessed by local fire marshal, fire chief and/or DCM Inspector) • Flush/pressure test for new and/or existing fire hydrants • Must have clear egress/access and emergency (for first responders) access to building • Must have ADA access completed. • Comply with ADA requirements: plumbing fixture heights, toilet partition widths, turnaround, signage, parking lot striping and signage, etc. • Emergency Responder Radio Coverage
	25. Year-End Inspection: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Engineers and/or Major Subs may be required. • Owner's list of documented warranty items • Reconciliation of user fees with DCM shall be completed prior to inspection
	26. Other inspections required before work is covered
	27. Third-party inspections/special inspections. Structural components, Roofing, Geotechnical, Commissioning, lab tests, etc.
	28. Procedure if bad soil or rock is encountered: Geotech and special inspections
	29. Inspection report distribution – weekly per Owner-Architect Agreement. All site inspections and observations are to be recorded and transmitted to the DCM Inspector via DCM's Engage Portal. The design professional must also concisely report any deficiencies encountered, problems or questions raised by the contractor, instructions or answers given to the contractor, and administrative or construction delays observed. The design professional must endeavor to write his or her reports utilizing descriptions of components and areas that are consistent with descriptions contained in the plans and specifications so that the "third-party reader" can understand what is being discussed and where it is located in the project. Photographs may be included for clarity. Keep photos to a minimum. Each report shall also be distributed by the design professional to the Owner and contractor promptly after conducting an inspection so that all parties are kept current regarding events on the project.
	30. Ready mix plant, file delivery tickets, slump tests, cylinders. Quality of concrete work; concrete testing
	31. Light gauge metal roof framing and/or wood truss framing to be inspected by the structural engineer.

	32. Record Drawings and As-Built Drawings: Contractor will maintain a set of drawings designated solely for As-Built Drawings to satisfy its closeout requirements. Contractor/Subcontractor shall, on a weekly basis, record all changes, revisions, modifications, additions, etc. to accurately reflect its completed work.
	33. Protection Of the Work: The General Contractor shall carefully secure and protect the work and all materials, equipment, or work of Sub-Contractors and others in the vicinity of the work and shall be liable for any loss or damage that results from Contractor`s failure to do so.
	*34. Use of site and existing building, access drive, signs
	*35. Conduct of contractor's personnel: No interaction with staff and/or students. No foul language, no smoking or use of tobacco products, no drugs, and no firearms on school property.
	*36. Use of existing toilets
	*37. Coordinate any utilities supplied by Owner
	*38. Coordinate outages and work in existing building with Owner
	*39. Keeping existing exit paths open
	*40. Routine job clean-up to be perform daily. Clean-up areas where work is performed including paths of access/egress utilized by Contractor's personnel and equipment. All generated waste and debris will be placed in dumpsters or other containment boxes.
	41. O.S.H.A. - Report all accidents - safety General Contractor's responsibility
	42. Contractor is reminded of obligation to comply with the Alabama Child Labor Law and E-Verify
	43. Building location relative to critical property line, easement, setback, etc.
	44. Surveyor to check foundation wall if location critical
	45. Verify sanitary outfall before committing floor level
	46. Stockpiling topsoil
	47. Protecting trees
	48. Soil Treatment, mix on site in presence of Job Superintendent
	49. What is expected of masonry work, mortar additive
	50. Problems with hollow metal - install proper fire labels
	51. Potential conflict of mechanical and electrical equipment; shop drawings
	52. Return air plenums (no combustibles)
	53. Fire damper installation issues
	54. Kraft-faced insulation is not to be installed exposed.
	55. Coordinate with local fire authority to assure access to the building for firefighting equipment during construction and before final acceptance. Provide fire extinguishers as required.
	56. Comply with fire hydrant requirement; coordinate with local Fire Authority or State Fire Marshal.
	*57. Certificate of Substantial Completion/Final Inspection All projects: Certificate must be activated via DocuSign link after final inspection and receipt of DCM Inspector's report. The correct DocuSign link is available from DCM's Engage Portal.
	58. Release of retainage – 30 days to complete punch list and closeout
	*59. Project Closeout - precedes Final Payment a. Warranties b. Operating and Maintenance Manuals c. As-built Drawings d. Other requirements

	60. Advertisement of Completion - start ad after substantial completion a. for projects less than $100,000.00, Advertisement of Completion is not required. b. for projects $100,000.00 or more, Contractor advertises for 3 weeks. The contractor can publish a notice using one or more of the following methods: • In a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done. • On a website that is maintained by a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done. • On a website utilized by the awarding authority for publishing notices. • If no newspaper is published in the county in which the work was done, and if the awarding authority does not utilize a website for the purpose of publishing notices, the notice may be given by posting at the courthouse for 30 days, and proof of the posting of the notice shall be given by the awarding authority and the contractor.

DETAIL OF PROJECT SIGN

N.T.S.



DETAIL OF WOOD SURROUND

N.T.S.

Notes:

1. Fully locally-funded State Agency and Public University projects: DCM Form C-15 must be included in the project manual regardless of expected bid amount. If the awarded contract sum is $100,000.00 or more, Contractor shall furnish and erect a project sign.
   Fully locally-funded K-12 school projects: Project sign is not required unless requested by Owner, if project sign is requested by Owner, include DCM Form C-15 in the project manual.
   Partially or fully PSCA-funded projects: DCM Form C-15 must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of contract sum. "Alabama Public School and College Authority " as well as the local owner entity must be included as awarding authorities on the project sign of all PSCA-funded projects. Exception: Alabama Community College System (ACCS) PSCA-funded projects with Notice-To-Proceeds issued after July 31, 2021 are not submitted to DCM.
   Fully locally-funded ACCS projects with Notice-To-Proceeds issued prior to August 1, 2021: DCM Form C-15 must be included in the project manual regardless of expected bid amount. If the awarded contract sum is $100,000.00 or more, Contractor shall furnish and erect a project sign.
2. Sign to be constructed of ¾" exterior grade plywood.
3. Paint with two coats best grade exterior paint before letters are painted. Option: In lieu of painted lettering on plywood, a corrugated plastic sign (displaying the same lettering, layout and colors as above) may be secured directly to the unpainted exterior grade plywood.
4. Sign shall be placed in a prominent location and easily readable from existing street or roadway.
5. Sign shall be maintained in good condition until project completion.
6. Slogan: Act 2020-167's title *"Investing In Alabama's Future"* should be placed on the project signs of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.

DCM Form C-10
Revised July 2022

DCM (BC) No. _____

PSCA Projects: PSCA No. _____

Application No. _____

Date: _____

APPLICATION and CERTIFICATE for PAYMENT

Attach DCM Form C-10SOV: Schedule of Values

TO OWNER: Entity Name: Address:	PROJECT:
FROM CONTRACTOR: Company Name & Address, which must exactly match co. name & payment address spelling as registered in State of AL Accounting & Resource System (STAARS) or AL Buys to avoid rejection: STAARS or AL Buys Vendor #:	ARCHITECT / ENGINEER: Firm Name: Address:

A. Total Original Contract	$
B. Fully Executed (fully signed) Change Order(s) Numbers __ through __	+$ _____
C. Total Contract To Date	$

1. Work Completed to Date per attached Schedule of Values *(Form C-10SOV's Column F Total)*		$
2. Materials Presently Stored *(When this amount is greater than $0.00, attach Form C-10SM: Inventory of Stored Materials, or similar list)*		+$ _____
3. Total Work Completed to Date & Materials Presently Stored *(_____% of Contract To Date)*		$
4. Less Retainage *(If Total Work Completed to Date & Materials Presently Stored (#3) is less than or equal to 50% of Total Contract to Date (C), Retainage = #3 x 0.05. Once #3 exceeds 50% of C and up until project is complete, Retainage = C x 0.025. $0 is retained on final payment application, see last bullet point below Instructions.)*	Final pay app? ☐ Yes.	−$ _____
5. Total Due		$
6. Less Total Previous Payments Billed *(Must exactly match #5 Total Due from previous payment application. # 6 is $0.00 if there is no previous payment application)*		−$ _____
7. Balance Due This Estimate		$

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that to the best of his knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for Work for which previous Certificates for Payments were issued and payments received from the Owner and that current payment shown herein has not yet been received.

By: _____ Date: _____
Contractor's Signature

Name & Title _____

Sworn and subscribed before me this _____ day of _____
Day Month, Year

Seal:

_____
Notary Public's Signature

ARCHITECT'S / ENGINEER'S CERTIFICATION

In accordance with the Contract Documents, the Architect/ Engineer certifies to the Owner that, to the best of the Architect's/ Engineer's knowledge and belief, the Work has progressed to the point indicated herein, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the amount approved.

By _____
Architect's / Engineer's Signature

Name & Title _____

Date _____

INSTRUCTIONS

- PSCA-funded projects, and State Agency-owned projects: Two copies of pay. app., each with original signatures and all attachments required.
- Date of first payment application cannot precede the Notice to Proceed's Begin Date.
- Pay. app. must exactly match an attached DCM Form C-10SOV: Schedule of Values.
- A change order must be fully executed before inclusion on a payment application.
- Contractor's signature date cannot precede the payment application date.
- Contractor and Notary signee dates must match.
- Progress schedules must be included with non-final payment applications.
- One payment application per month may be submitted.
- On a final payment application, the following is required for release of retainage: all change orders must be fully executed (signed by all parties and approval authorities) and included in B., the Certificate of Substantial Completion for entire work is fully executed, and all other close-out requirements per General Conditions Article 34 are completed.

APPROVAL

_____
Owner Entity

By _____
Signature

Name & Title _____

Date _____

SCHEDULE OF VALUES (SOV)

DCM Form C-10SOV
Revised October 2021

Project:	DCM (BC) Project Number:
	PSCA Project Number, if any:
Contractor Company:	Application Number:
	Application Date:
	Period From: / Period To:

A	B	C	D	E	F	G	H	I	J
Item No.	Description of Work	Scheduled Value (including fully executed [signed by all parties] change order amounts)	Work Completed: Work Previously Completed (Previous pay app SOV's column F. D is $0 if this SOV is for first pay app.)	Work Completed: Work Completed This Period (Period as noted above)	Total Work Completed to Date (This application SOV's D + E)	Materials Presently Stored (G total greater than $0 must match C-10SM's column E total. This SOV's G amounts are not in this SOV's D nor E amounts.)	Total Work Completed to Date & Materials Presently Stored (This SOV's F + G)	Percent of Contract Completed to Date (This SOV's H / C)	Retainage (This column's Total's cell formula calculates the applicable variable rate)
1.					$ -		$ -		Retainage Variable Rate:
2.					$ -		$ -		
3.					$ -		$ -		
4.					$ -		$ -		If Total Work Completed to Date & Materials Presently Stored (H) is less than or equal to 50% of Total Scheduled Value (C), Retainage = H x 0.05.
5.					$ -		$ -		
6.					$ -		$ -		
7.					$ -		$ -		
8.					$ -		$ -		
9.					$ -		$ -		
10.					$ -		$ -		
11.					$ -		$ -		
12.					$ -		$ -		
13.					$ -		$ -		
14.					$ -		$ -		
15.					$ -		$ -		Once H exceeds 50% of C and up until project is complete, Retainage = C x 0.025.
16.					$ -		$ -		
17.					$ -		$ -		
18.					$ -		$ -		
19.					$ -		$ -		
20.					$ -		$ -		
21.					$ -		$ -		There will be no retainage on final payment application.
22.					$ -		$ -		
23.					$ -		$ -		
24.					$ -		$ -		
25.					$ -		$ -		
	TOTALS:	$ -	$ -	$ -	$ -	$ -	$ -		$ -
This pay app SOV's column totals must match amounts in this pay app Form C-10 per the following indicated Form C-10 line #s:		C.	None	None	1.	2.	3.	3.	4.

Note: If this SOV's column G: Materials Presently Stored includes any amounts other than $0, then DCM Form C-10SM: Inventory of Stored Materials with back-up receipts must be submitted as part of the payment application documentation.

INVENTORY OF STORED MATERIALS

DCM Form C-10SM
Revised October 2021

Project:	DCM (BC) No.:
	PSCA No, if any:
Contractor Company:	For Estimate No.:
	For Period Ending:

A	B	C	D	E
Description	**Materials Stored Last Period**	**Materials Purchased This Period (period noted above)**	**Materials Used This Period (period noted above)**	**Materials Presently Stored (B + C - D)**
TOTALS:				

Instructions :

· This Form C-10SM must be submitted as part of the payment application documentation when a Materials Presently Stored amount of anything greater than $0 is noted on line 2 of DCM Form C-10: Application and Certificate for Payment.

· Receipts must be provided as attachments to this form C-10SM for all amounts placed in Column C: Materials Purchased This Period.

· The total $ amount of this Form C-10SM's column E: Materials Presently Stored must match both Form C-10's line 2: Materials Presently Stored, and Form C-10SOV: Schedule of Values' total $ amount of Column G: Materials Presently Stored.

· The $ amounts in this current Form C-10SM's Column D: Materials Used This Period are amounts that must all be included in the current payment application's Form C-10SOV's Column E: Work Completed This Period.

· The $ amounts in this current Form C-10SM's Column E: Materials Presently Stored are the amounts that must be listed in the next payment application's Form C-10SM's Column B: Materials Stored Last Period.

SAMPLE PROGRESS SCHEDULE & REPORT	CONTRACTOR (Contractor may use own form in lieu of Form C-11):	DATE OF REPORT:
DCM (BC) No.:		
PSCA projects: PSCA No.:		PROCEED DATE:
PROJECT:	ARCHITECT/ENGINEER:	PROJECTED COMPLETION DATE:

	WORK DIVISION	%	AMOUNT													
1.	GENERAL REQUIREMENTS															
2.	SITEWORK															
3.	CONCRETE															
4.	MASONRY															
5.	METALS															
6.	WOOD AND PLASTIC															100%
7.	THERMAL AND MOISTURE PROTECTION															90%
8.	DOORS AND WINDOWS															80%
9.	FINISHES															70%
10.	SPECIALTIES															60%
11.	EQUIPMENT															50%
12.	FURNISHINGS															40%
13.	SPECIAL CONSTRUCTION															30%
14.	CONVEYING SYSTEMS															20%
15.	MECHANICAL															10%
16.	ELECTRICAL															0%
TOTAL ORIG. CONTRACT		100%														
ANTICIPATED DRAW IN $1,000																
ACTUAL DRAW IN $1,000																

LEGEND: ANTICIPATED ACTIVITY — ACTUAL ACTIVITY — ANTICIPATED CASH FLOW — ACTUAL CASH FLOW

USE ADDITIONAL SHEETS IF JOB IS SCHEDULED OVER 12 MONTHS.

DCM Form C-11 August 2021

TO: Alabama Department of Finance
Real Property Management
Division of Construction Management
770 Washington Avenue, Suite 444
Montgomery, AL 36104
(334) 242-4082 (ph), inspections@realproperty.alabama.gov

DCM Form B-10
August 2021

STATEMENT OF FIELD OBSERVATIONS

Date: _____

DCM (BC) #	**PSCA #**
PROJECT NAME AND LOCATION:	**OWNER ENTITY NAME & ADDRESS:** **Phone No.**
CONTRACTOR COMPANY NAME & ADDRESS: **Phone No.**	**ARCHITECTURAL/ENGINEERING FIRM NAME & ADDRESS:** **Phone No.**

PROJECT DATA ON THE DATE OF OBSERVATION: No. of Workers _____

Site Conditions _____ Weather _____

Starting Date _____ Contract Completion Date _____

Scheduled State of Completion _____% Estimated Actual Completion _____%

Contractor's Superintendent _____ Job Phone # _____

COMMENTS / DEFICIENCIES:

Signature _____ **Report No.** _____

cc: Owner, Architect/Engineer, Contractor, DCM Office (inspections@realproperty.alabama.gov)**, DCM Inspector**

Alabama Department of Finance
Real Property Management
Division of Construction Management
770 Washington Avenue, Suite 444
Montgomery, Alabama 36104
(334) 242-4082 (phone)

DCM Form B-12
Revised July 2022

CHANGE ORDER CHECKLIST

For use with DCM Form C-12 and DCM Form 9-J

WHICH FORM DO YOU USE?

Use **DCM Form C-12** for contracts of state agencies and departments and State Department of Education (SDE) projects. Also use for ACCS projects with Notice-to-Proceeds issued prior to August 1, 2021.
Use **DCM Form 9-J** for contracts of projects partially or fully Public School and College Authority (PSCA)-funded, except for ACCS projects with Notice-To-Proceeds issued after July 31, 2021. Include a completed **DCM Form B-11:** Change Order Justification with each copy of either DCM Forms C-12 or 9-J.

Verify that the following information is inserted in the spaces provided on the CONTRACT CHANGE ORDER form, or attached to the form where attachments are noted to be acceptable or obviously necessary. Do not staple forms; use clips.

1.	**CHANGE ORDER NUMBER:** Insert current change order number.
2.	**DATE:** Insert date.
3.	**DCM (BC) PROJECT NUMBER:** Insert DCM Project Number in the block provided at top of document.
4.	**CONTRACTOR** Insert name and address of the Contractor, exactly as they appear on the Construction Contract.
5.	**NAME OF PROJECT:** Under "Project", insert the complete name of the project as identified in the bid documents. If using DCM Form 9-J, insert the PSCA Project Number in the space provided.
6.	**CONTRACTOR'S PROPOSALS:** Under "TERMS", identify the change order proposals submitted by the contractor that are being addressed by the Contract Change Order. Identify these proposals by inserting their dates.
7.	**DESCRIPTION OF THE CHANGE(S) IN WORK:** Fully describe the change or changes to the original contract work for which the Construction Contract is being modified. This description should be written so that a reader of the document who is not directly involved in the project can understand what is being changed. If the space provided on the form is inadequate for such a description, use attachments and cite them.
8.	**CONTRACT AND CHANGE ORDER AMOUNTS:** Insert the applicable dollar amounts to record the original contract sum, change orders, and the currently revised contract sum.
9.	**EXTENSION OF TIME:** If the Contract Time is being extended by the Contract Change Order, insert appropriate number of **calendar days** in the space provided. If the Contract Time is not being extended, insert "NONE".
10.	**RESPONSIBILITY FOR CHANGE ORDER FUNDING - DCM Form 9-J ONLY:** The authority responsible for funding the change order is to be identified in the following sentence in the form,: "The amount of this Change Order will be the responsibility of _____." Insert whichever is appropriate: (1) "PSCA", (2) name of LEA, or (3) "PSCA" and name of LEA.
11.	**SIGNATURES:** The signature spaces for State Agency, PSCA and fully locally-funded Alabama Community College System projects are different from each other. Download the appropriate document per Owner/project type from www.dcm.alabama.gov/forms.aspx. Before submitting a Contract Change Order to DCM, the document must be signed by the contractor, surety (for additive change orders only), design professional and owner (local owner or using agency). Signature by the surety is not necessary on deductive change orders or change orders involving only extensions of time. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign DCM Form B-11: Change Order Justification.
12.	**ATTACHMENTS:** To each of the three (3) copies (with original signatures) of the Contract Change Order form, attach with clips (do not staple): a. Contractor's change order proposals and/or invoices providing a detailed breakdown of change order costs. General Contractors (GC) must include subcontractors' (sub) quotes as backup. All GC and sub quotes must be broken down by labor (hours and rates), materials including quantities and unit prices (with receipts or quotes attached), equipment whether rented or owned (with receipts or quotes attached), and Overhead & Profit (OH&P). 1. Total OH&P can be a maximum of 25% divided between GC and subs; GC can have a maximum of 15% OH&P (in which case a sub could have up to 10% OH&P). See General Conditions- Article #19. 2. Sales tax cannot be included in change orders. 3. Deductive change orders also require backup including breakdown of labor and material, and must also deduct OH&P if included in original bid. Include specification section regarding allowances. b. **POWER OF ATTORNEY** for the individual signing the Contract Change Order for the surety. c. **DCM Form B-11, CHANGE ORDER JUSTIFICATION:** completed and signed by the design professional and owner.

This form is provided solely for the purpose of inclusion in the project manual. A Construction Contract for fully locally-funded K-12 projects must be initiated via the appropriate DocuSign link from DCM's Engage Portal at https://engagealabamarpm.facilityforce.cloud by the Lead Design Professional Firm.

DCM Form C-12 (fully locally-funded K-12 school project)
revised October 2024
A Change Order is not valid without an accompanying completed Change Order Justification (DCM Form B-11).

CONTRACT CHANGE ORDER

Change Order No. _____ **Date** _____ **DCM (BC) No.** _____

TO: (*Contractor*) Co. Name: Address:	**PROJECT:**

TERMS: You are hereby authorized, subject to the provisions of your Contract for this project, to make the following changes thereto in accordance with your proposal(s) dated _____

_____.

FURNISH the necessary labor, materials, and equipment to (*Description of work to be done or changes to be made. If the description is continued in an attachment, identify the attachment below; only use an attachment if fields below become full.):*

Description continued from Page 1:

ORIGINAL CONTRACT SUM $ _____

NET TOTAL OF PREVIOUS CHANGE ORDERS $ _____

PREVIOUS REVISED CONTRACT SUM $ _____

THIS CHANGE ORDER WILL INCREASE DECREASE THE CONTRACT SUM BY $ _____

REVISED CONTRACT SUM, INCLUDING THIS CHANGE ORDER $ _____

EXTENSION OF TIME resulting from this Change Order None *or* _____ Calendar days.

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

_____
Architectural/Engineering Firm

Recommended By _____

Name & Title _____

APPROVAL

ALABAMA STATE DEPARTMENT OF EDUCATION (SDE)

(Required for locally-funded, SDE projects.)

By _____ Date: _____
State Superintendent of Education

CONTRACTING PARTIES

_____
Contractor Company

By _____

Name & Title _____

_____
Awarding Authority/Owner Entity

By _____

Name & Title _____

CONSENT OF SURETY (for additive $ change orders only)

_____
Surety Company

By _____
(Attach current Power of Attorney)

Name & Title _____

Routing of the Construction Contract to reviewers and e-signers is automated through DocuSign. DocuSign links for fully locally-funded contract documents are available from DCM's Engage Portal at https://engagealabama-rpm.facilityforce.cloud

TO: **Alabama Department of Finance**
Real Property Management
Division of Construction Management
770 Washington Avenue, Suite 444
Montgomery, Alabama 36104
(334) 242-4082 FAX (334) 242-4182

CHANGE ORDER JUSTIFICATION

Purpose and instructions on next page.
Do not staple this form and/or attachments; use clips.

Change Order No. _____

Date: _____

DCM (BC) No. _____

(A)

PROJECT NAME & LOCATION:	OWNER ENTITY NAME & ADDRESS:
CONTRACTOR COMPANY NAME & ADDRESS:	ARCHITECTURAL / ENGINEERING FIRM NAME & ADDRESS:

(B) **DESCRIPTION OF PROPOSED CHANGE(S):** **ATTACH CONTRACTOR'S DETAILED COST PROPOSAL(s)**

AMOUNT: ☐ **ADD** ☐ **DEDUCT $_____** **TIME EXTENSION: _____ CALENDAR DAYS**

(C)

ORIGINAL CONTRACT AMOUNT		PREVIOUS C.O.'s _____ THRU _____		CONTRACT AMOUNT PRIOR TO PROPOSED CHANGE ORDER
$_____	+	$_____	=	$_____

(D) **JUSTIFICATION FOR NEED OF CHANGE(S):**

(E) **JUSTIFICATION OF CHANGE ORDER vs. COMPETITIVE BID:**

(F) **ARCHITECT / ENGINEER'S EVALUATION OF PROPOSED COST:**

(G)

CHANGE ORDER RECOMMENDED	CHANGE ORDER JUSTIFIED AND APPROVED
_____ ARCHITECTURAL / ENGINEERING FIRM NAME	_____ LOCAL OWNER ENTITY NAME
By: _____ ARCHITECT / ENGINEER'S SIGNATURE	By: _____ OWNER'S SIGNATURE
By: _____ OWNER'S PROJECT REPRESENTATIVE'S SIGNATURE	By: _____ OWNER'S LEGAL COUNSEL'S SIGNATURE

CHANGE ORDER JUSTIFICATION: PURPOSE and INSTRUCTIONS

PURPOSE

The awarding of work through an existing contract may potentially conflict with, or violate, the "Competitive Bid Laws" of the State of Alabama. **The determination of legality of Change Orders rests with the Awarding Authority and its legal advisor.** In a June 15, 1979, Opinion, the Office of the Attorney General offered guidelines for making such determinations in conjunction with considering the facts and merits of each situation. The purpose of the CHANGE ORDER JUSTIFICATION is to provide a means through which the Awarding Authority considers these guidelines and the intent of the "Competitive Bid Laws" when authorizing Change Orders. Pursuant to these guidelines, the following types of changes meet the criteria for awarding work through Change Orders in lieu of through the Competitive Bid process:

I. Minor Changes for a monetary value less than required for competitive bidding.

II. Changes for matters relatively minor and incidental to the original contract necessitated by unforeseeable circumstances arising during the course of the work.

III. Emergencies arising during the course of the work of the contract.

IV. Bid alternates provided for in the original bidding where there is no difference in price of the change order from the original best bid on the alternate.

V. Changes of relatively minor items not contemplated when the plans and specifications were prepared and the project was bid which are in the public interest and which do not exceed 10% of the contract price.

Under these guidelines the cumulative total of Change Orders, including any negotiations to bring the original contract price within the funds available, would become questionable if the total of such changes and negotiations exceed 10% of the original contract price. These guidelines are not intended to interfere with the Awarding Authority's good faith discretion to respond to specific situations in the public's best interest. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to the Division of Construction Management (DCM).

INSTRUCTIONS

The CHANGE ORDER JUSTIFICATION is to be prepared by the design professional, who has evaluated the fairness and reasonableness of the proposed cost of the change(s) and recommends that the proposed Change Order be executed. The fully executed Form B-11: CHANGE ORDER JUSTIFICATION must accompany the proposed DCM Form C-12: Change Order. Instructions for completing the B-11 form are:

1. Insert the proposed Change Order Number, date of the Justification, and DCM (BC) Project Number in the spaces provided in the upper right-hand corner.

2. **Section (A):** Insert the complete name and address of the PROJECT, OWNER, CONTRACTOR, AND ARCHITECT/ENGINEER.

3. **Section (B)**: Provide a complete description of the proposed changes in work, referring to and attaching revised specifications and/or drawings as appropriate. An attachment may be used if additional space is needed, but insert the proposed amount and time extension of the change(s) in the spaces provided. **Attached a copy of the contractor's detailed cost proposal.**

4. **Section (C**): Insert the Original Contract amount, the net increase or decrease of previous Change Orders, and the Current Contract amount (preceding the currently proposed Change Order).

5. **Section (D):** Explain why it is necessary, or in the public's interest, to make the proposed change(s) to the Work.

6. **Section (E)**: Explain why award of the changed work to the existing contractor instead of awarding the work under the competitive bid process is justified.

7. **Section (F)**: The design professional must state his evaluation of the reasonableness and fairness of the proposed costs based upon his review of the contractor's proposal.

8. **Section (G)**: The design professional must recommend the Change Order to the Owner by signing the document; the Owner may require such recommendation from other individuals. The Owner must sign the document indicating that they believe change order action in lieu of the competitive bid process is justified for the proposed change(s). **Review of the matter and signing of the document by the Owner's legal counsel is highly recommended. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to DCM.**

CHANGE PROPOSAL RECAP SHEET

Project Name : _____ Date : _____

Arch# Project Number : _____

Contractor Name : _____ Initiated By : (Check One) Owner/Architect ☐ Contractor ☐ Subcontractor ☐

Reference Change Proposal Request Number : _____

Brief Description of Proposed Change : _____

GENERAL CONTRACTOR Direct Cost Summary (Attach Supplemental Sheets as necessary)

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

Material :	$ -
Labor :	$ -
Equipment :	$ -
General Contractor Subtotal :	$ -

SUBCONTRACTOR Direct Cost Summary (Attach Supplemental Sheets as necessary)

Item / Description *	Quantity	Unit	Amount							
			Unit $	Material	Unit $	Labor	Unit $	Equipment	Unit $	Sub-sub
			Sub Totals :	$ -		$ -		$ -		$ -

Material :	$ -
Labor :	$ -
Equipment :	$ -
Sub-sub :	$ -
Subcontractor Subtotal :	$ -

UNIT PRICE Cost Summary (Attach Supplemental Sheets as necessary)

Item / Description *	Quantity	Unit	Amount	
			Unit $	Total Unit Price
			Sub Totals :	$ -

Unit Price Subtotal : $ -

Mark-up Calculations

Subcontractors Subtotal :	$ -		
General Contractor Subtotal :	$ -		
Unit Price Subtotal :	$ -		
TOTAL Direct Cost :	$ -		
** General OH&P on Own Work :	$ -	15%	Amount not to exceed 15%, see Article 19 of the General Conditions
** Total OH&P on Sub Work :	$ -	25%	Amount not to exceed 25%, see Article 19 of the General Conditions

TOTAL COST CHANGE $ - Add ☐ Deduct ☐

*** **TOTAL TIME CHANGE** _____ Calendar Days (Critical paths impact only)

* Materials permanently installed in the building shall be sales tax free.

** "Overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

*** Any requests for additional time are only considered if the critical path of the project is extended. Attach additional pages with explanation of how the change affects the critical path of the project.

Do not staple this form and/or attachments; use clips.

GENERAL CONTRACTOR'S ROOFING GUARANTEE

DCM (BC) Project No. _____

Project Name & Address	Project Owner Entity(ies) Name(s) & Address(es)

General Contractor's Company Name, Address, & Telephone Number	**EFFECTIVE DATES OF GUARANTEE**
	Date of Acceptance:
	Date of Expiration:

1. The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations.

2. The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal, roof decking and/or sheathing; all materials used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of the roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of substantial completion of the project. This guarantee does not include liability for damage to interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the general contractor did not damage or did not accomplish or was not charged to accomplish.

3. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon proper notification or leaks or defects by the Owner or Architect.

A. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.

B. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.

C. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.

D. During the Guarantee period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.

E. The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

_____
General Contractor's Authorized Signature

_____
Typed Name and Title

TO: **Alabama Department of Finance**
Real Property Management
Division of Construction Management
770 Washington Avenue, Suite 444
Montgomery, AL 36130-1150
(334) 242-4082

DCM Form C-13
revised October 2024;
(Must be activated via DocuSign link from DCM's Engage Portal)

CERTIFICATE OF SUBSTANTIAL COMPLETION

ROUTING PROCEDURES *ON NEXT PAGE*

DCM (BC) No. _____

OWNER ENTITY NAME AND ADDRESS:	**ARCHITECTURAL / ENGINEERING FIRM NAME AND ADDRESS:**
Email to receive executed copy: _____	Email to receive executed copy: _____
CONTRACTOR COMPANY NAME AND ADDRESS:	**BONDING COMPANY NAME AND ADDRESS:**
Email to receive executed copy: _____	Email to receive executed copy: _____
PROJECT:	

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 disruption or interference by the Contractor in completing or correcting any remaining unfinished Work. The Date of Substantial Completion is the date upon which all warranties for the designated Work commence, unless otherwise agreed and recorded herein.

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.

Only <u>one</u> (1) originally executed substantial completion form shall be routed for signature. DCM office will mail the fully-executed original to the Owner and email copies to all parties.

RECOMMENDED BY *(signature and email address required)*:	
ARCHITECT/ENGINEER: _____	DATE: _____
CONTRACTING PARTIES:	
CONTRACTOR: _____	DATE: _____
OWNER: _____	DATE: _____
_____	DATE: _____
APPROVALS:	
DCM INSPECTOR: _____	DATE: _____
DCM CHIEF INSPECTOR: _____	DATE: _____
DCM DIRECTOR: _____	DATE: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION ROUTING PROCEDURE

Only one (1) substantial completion form shall be routed for e-signatures, via DocuSign link from DCM's Engage Portal at: https://engagealabama-rpm.facilityforce.cloud

NOTICE

THE EXECUTED "GENERAL CONTRACTOR'S ROOFING GUARANTEE" (DCM Form C-9) AND ANY OTHER ROOFING WARRANTY REQUIRED BY THE CONTRACT MUST ACCOMPANY THIS CERTIFICATE TO OBTAIN DCM APPROVAL.

Also, any standard manufacturer's roofing guarantees which contain language regarding the governing of the guarantee by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the Laws of the State of Alabama shall govern all such guarantees.

DCM Form B-13
Revised October 2024

FINAL PAYMENT CHECKLIST (FPC)

To be completed by the Architect/Engineer and submitted to DCM for review via the correct DocuSign link from the Engage Portal; applicable only to state agencies, partially or fully PSCA-funded and other bond-funded projects. The FPC shall include all attachments including the Contractor's Application for Final Payment. If all PSCA funds are expended prior to Final Payment, it is not a requirement to submit the Application & Certificate for Final Payment along with the supporting documentation to DCM.

(For further guidance refer to Article 34/Final Payment of DCM Form C-8: General Conditions of the Contract.)

PROJECT:	**DCM No.** _____ **PSCA No.** _____ (If applicable)

YES	N/A	Select "YES" or "N/A" as applicable.
☐	☐	Application and Certificate for Final Payment, DCM Form C-10: Attach one copy to FPC. The application must include original signatures of all parties and include all application attachments.
☐		Certificate of Substantial Completion, DCM Form C-13: Attach one fully-executed copy to FPC.
☐		Affidavit of Advertisement for Completion: Attach one copy of the affidavit of publication, including the image of the advertisement which may be based on DCM Form C-14, to the FPC. An affidavit is a legal document issued by the publisher, which must be requested from the publisher.
☐	☐	Contractor's Affidavit of Payment of Debts & Claims, DCM Form C-18: Attach one copy to FPC.
☐	☐	Contractor's Affidavit of Release of Liens, if required by Owner, DCM Form C-19: Attach one copy to the FPC.
☐	☐	Consent of Surety to Final Payment, if any, To Contractor, DCM Form C-20: Consent is required for projects with P&P Bonds. Original has been delivered to Owner. Attach one copy to FPC.
☐	☐	General Contractor's Roofing Guarantee, DCM Form C-9, and Other Specified Roofing Guarantees, if any: Attached to Certificate of Substantial Completion.
☐	☐	Contractor's One-Year Warranty: Original has been delivered to the Owner. Attach one copy to the FPC.
☐	☐	Other Warranties: All other specified original warranties has been delivered to the Owner. Attach one copy to the FPC.
☐	☐	Record Documents: Specified "As-built" plans and specifications have been delivered to the Owner.
☐		O & M Manuals: Specified instructions and O&M Manuals have been delivered to the Owner.
☐	☐	Time Extension: Over-run of Contract Time has been reconciled by: ☐ Change Order ☐ Liquidated Damages ☐ Attached explanation
☐	☐	Additional Documents or Explanations which are attached:

Submitted By: _____
Architectural / Engineering Firm

_____ Signature | _____ Printed Name and Title | _____ Date

Final Reconciliation of Fees: Between the final change order execution and the year-end inspection, report the final project cost to the Engage Portal at https://engagealabama-rpm.facilityforce.cloud (back-up is not needed unless requested by DCM). DCM will then email a Final Reconciliation of Fees Statement to the Owner. If the Final Statement shows a net payment is owed to DCM, that amount must be paid prior to scheduling the year-end inspection. If the Final Statement shows a net refund is owed then a check will be mailed to the Owner.

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Contractor's Affidavit of Payment of Debts and Claims

To Owner (*Entity name and address*)**:**	**Project** (*Same as appears in the Construction Contract*)**:**

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

EXCEPTIONS:

Supporting Documents Attached Hereto:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. DCM Form C-20, Consent of Surety to Final Payment, may be used for this purpose.

   Indicate attachment: ☐ Yes ☐ No

The following supporting document should be attached hereto if required by the Owner:

1. Contractor's Release of Waiver of Liens.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof.
3. Contractor's Affidavit of Release of Liens, DCM Form C-19.

Contractor (*Insert company name and address*)**:**

By:_____
Signature of authorized representative

_____
Name and Title

Sworn to and subscribed before me this _____ day

of _____, _____.

_____
Notary Public's Signature

My commission expires: _____

Seal:

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Contractor's Affidavit of Release of Liens

To Owner (*Entity name and address*)**:**	**Project** (*Same as appears in the Construction Contract*)**:**

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, 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 or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Construction Contract referenced above.

EXCEPTIONS:

Supporting Documents Attached Hereto:

1. Contractor's Release of Waiver of Liens.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof.

Contractor (*Insert company name and address*)**:**

By: _____
Signature of authorized representative

_____
Name and Title

Sworn to and subscribed before me this _____ day

of _____, _____.

_____
Notary Public's Signature

My commission expires: _____

Seal:

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Surety's Bond Number: _____

CONSENT OF SURETY TO FINAL PAYMENT

To Owner (*Entity name and address):*	**Project** (*Same as appears in the Construction Contract*)**:**

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

Surety (*Insert name and address of Surety*)

on bond of

Contractor (*Insert name and address of Contractor*)

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to

Owner (*Insert name and address of Entity*)**:**

as set forth in said Surety's bond.

SIGNED AND SEALED this _____ day of _____, _____.

SURETY:

_____ Seal:
Company Name

By _____
Signature of Authorized Representative

_____
Printed Name and Title

Note: Original Power of Attorney for the Surety's signatory shall be furnished with each of the original forms to be attached to each of the four (4) final payment forms.

SAMPLE FORM OF ADVERTISEMENT FOR COMPLETION

LEGAL NOTICE

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

that _____,
(*Contractor Company Name*)
Contractor, has completed the Contract for ☐(Construction) ☐(Renovation) ☐(Alteration) ☐(Equipment) ☐(Improvement) of (*Name of Project*):

at _____

(*Insert location data in County or City*)
for the State of Alabama and the (County) (City) of _____, Owner(s), and have 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

_____

_____
(*Architect / Engineer*)

_____
(Contractor)

_____
(Business Address)

NOTE: This notice must be run for a minimum of three weeks for projects of $100,000.00 or more. For acceptable methods of advertisement, see General Conditions of the Contract, Article 34. Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher or website owner and a printed copy of the notice published. A final settlement shall not be made upon the contract until the expiration of 30 days after the completion of the notice.

CERTIFICATE OF ASBESTOS FREE BUILDING MATERIALS

The undersigned hereby states that all building materials incorporated, installed, and used during the construction process for the below listed project by the Contractor or its Subcontractors of any tier are 100% asbestos free. **Asbestos Free means containing 0% asbestos in any form.** Refer to Section 01600, Product Requirements.

McKee Project Name: _____

McKee Project Number: _____

CERTIFICATION: The undersigned certifies that he or she is authorized to execute contracts and legal documents on behalf of the General Contractor as legally named, that this certification is submitted in good faith without fraud or collusion with any other person, that the information indicated in this document is true and complete, and that the document is made in full legal agreement.

To: _____

(Owner / Awarding Authority of Construction Contract)

Date _____

Legal Name of General Contractor _____

General Contractor State License No. _____

(Exactly as appears on license including designation letters)

General Contractor Mailing Address _____

_____

By (Legal Signature) _____

Name & Title (print) _____

Telephone Number _____

E-Mail Address _____

SECTION 01010 - SCOPE OF THE WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS AND GENERAL INFORMATION

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

1.2 SUMMARY

A. This Section includes the following:

1. Type of the Contract.
2. Work Under This Contract.
3. Completion Times.
4. **Division of Construction Management User Fees**.
5. Project Work Identification.
6. Owner-furnished products.
7. Supervision.
8. Contractor Use of premises.
9. Definitions.
10. Work Under Other Contracts.
11. Building and Site Construction.
12. General Issues.
13. Temporary Electrical Power and Jobsite Utilities.
14. Site Security and Insurance Requirements.
15. Protection of Work in Place.
16. Work restrictions.
17. Owner's occupancy requirements.
18. Specification formats and conventions.
19. **Site Visit Re-Inspection Fees**

B. Related Sections include the following:

1. Division 1 Section 01500 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 TYPE OF CONTRACT

A. Construction Contract (DCM Form C-5).

1.4 WORK UNDER THIS CONTRACT

A. Sealed Proposal shall be received as follows:

1. One (1) Sealed Envelope MUST include the following:

a. General Contractor’s Name and State General Contractor’s License number MUST be legible on the front of the envelope.

b. One (1) Bid Proposal for all work as indicated on drawings and specifications.

c. Unit Price Attachment Sheet MUST be included if document is included in the project manual.

d. One (1) Bid Bond or certified check.

e. One (1) Sales Tax Form.

1.5 COMPLETION TIMES

A. All work shall be completed no later than January 31, 2027.

1.6 DIVISION OF CONSTRUCTION MANAGEMENT USER FEES & OTHER FEES

A. The Contractor **MUST Include** all costs for permits and fees per the General Conditions of the Contract DCM Form C-8; Article 44 “Permits, Laws and Regulations”, Paragraph A Permits, Fees and Notices Sub Paragraphs (1) and (2).

B. The Contractor shall be responsible for all “Re-Inspection Fees.” Site Visit Re-Inspection Fees: It is the contractor’s responsibility to have the project ready for site visits (inspections) when they are scheduled. If the project is not ready for the scheduled inspection and it is determined, and failed inspection requiring additional visits, by the Architect, AHJ, (Authorities Having Jurisdiction), any governmental agency or any other entity requires a re-inspection with the Architect, AHJ, or Engineer present, the contractor shall pay the Architect, Engineers or AHJ each, a re-inspection fee of $1,500.00, or other amounts (less or greater) set forth by other portions of the Contract Documents. Payments shall be made directly to the Architect, Engineer, or AHJ respectfully, five (5) days prior to the scheduled re-inspection unless other arrangements are made and agreed upon by each party in writing.

1.7 PROJECT / WORK IDENTIFICATION

A. General: Project name is as indicated in the Advertisement for Bids and as shown on the Contract Documents prepared by Lathan Mckee, 631 S. Hull Street Montgomery, Alabama 36104.

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

1. Existing site conditions and restrictions on use of the site including ingress and egress to the site.

2. Grading operations at the site.

3. The Contractor shall be responsible to secure the site during the execution of the work and provide proof of insurance including but not limited to General Liability, W/C, Auto, Equipment, etc.

C. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, the Project Manual, Technical Specification Sections, Drawings, Addenda and modifications to the Contract Documents issued subsequent to the initial printing of this Project Manual and the Drawings, and including but not necessarily limited to, printed material referenced by any of the above. It is recognized that the Work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions, and other forces outside the contract documents.

1.8 OWNER FURNISHED PRODUCTS

A. None

2. SUPERVISION

A. Supervision: The Contractor shall provide adequate supervision of the project to ensure proper supervision for all work.

1.9 CONTRACTOR USE OF PREMISES

A. General: During the entire cleanup period the Contractor shall have the exclusive use of the premises for cleanup operations, including full use of the site as shown on the Drawings.

B. Limitations of exclusive use of the site:

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

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

3. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds and or designated storage areas as indicated.

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

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

6. Furnish and install by contractor temporary barricades, fencing, etc., as indicated or otherwise required, to restrict pedestrian and vehicular traffic from construction operations, including in part, Owner's staff, the public, students, children, and residents of the adjacent residential neighborhoods.

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

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

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

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

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

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

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

14. The Contractor shall furnish necessary temporary toilets for all work forces on the job site.

PART 2 - SCOPE OF THE WORK

2.1 DEFINITIONS

A. The Scope of the Work of the Contract is meant to be viewed as a successor to the General Special Conditions of the Contract. Should any discrepancy or ambiguity be noted, the Scope of the Work of the Contract shall apply and the General Special Conditions of the Contract shall defer to Scope of the Work of the Contract Documents. The scope of the work shall be taken in its entirety by all contractors. In signing the contract all contractors have read and understand that the Scope of the Work and the General Special Conditions are taken in their entirety.

1. The term "Design Consultant" shall be construed to mean "Architect".
2. The terms "Owner" shall mean " Saraland City Schools ".
3. **Site Visit Re-Inspection Fees**: The contractor is responsible for all Fees.

2.2 WORK UNDER OTHER CONTRACTS

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

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

1. Work done by others or by Owner.
    a. Any items noted N.I.C.
    b. Construction Testing as defined in applicable sections of the project manual.

2.3 BUILDING AND SITE CONSTRUCTION

A. The Contractor shall maintain the entire site, provide dust control and keep the streets clean at all times and or as directed by the Architect. The Contractor shall call for and be responsible for the locating of all utilities prior to start of work. Use extreme care when working in close proximity to the existing water lines to prevent movement and damage to the water lines.

B. The Contractor shall install and or replace all fencing including furnish and install all temporary fencing as required for all work including safety barriers, signs, traffic directional signals, temporary stripping, flagman, temporary road plates and any temporary roads around any obstruction and or work being constructed. The Contractor shall make all provisions to keep the public and or temporary access roads open during the duration of the work.

C. The Contractor shall maintain & level, all temporary roads and temporary lay down and storage areas using same stone base material. Roads must have no potholes, dips, or rises and provide access to and from the site and other locations on site. The Contractor shall maintain the temporary roads used to move material on the site. Temporary roads are existing and the Contractor shall maintain these temporary roads throughout the duration of construction activity while Contractor is onsite.

D. The Contractor is responsible for all work required to install new work to include demolition preparation of surface to receive new work, dust controls and cleaning of all surfaces affected by work.

2.4 GENERAL ISSUES

A. The Contractor shall be responsible for their own on-site safety requirements within the site per OSHA regulations.

B. Only an approved company owned and insured vehicle shall be allowed on to the construction site. Vehicles shall be clearly marked and identified with the company logo and or name.

2.5 TEMPORARY ELECTRICAL POWER AND JOBSITE UTILITIES

A. The Contractor is responsible for the all costs associated with temporary electrical requirements for performance of the work. The Contractor shall be responsible for the all costs associated with temporary water required for the performance of the work. The Contractor is responsible for all other utility costs as required for the performance of the work.

2.6 SITE SECURITY / INSURANCE REQUIREMENTS

A. The Contractor shall have care custody and control of the site. Contractor shall be responsible for the replacement of their material, equipment, and any loss of such. Contractor shall be responsible for securing all material and equipment. If there is a loss and or damage of material and equipment, that loss shall go against the Contractor's insurance coverage.

2.7 PROTECTION OF WORK IN PLACE

A. The Contractor shall protect all completed work and any rework shall be the responsibility of the contractor **at** no additional cost to the owner.

2.8 WORK RESTRICTIONS

A. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect and Owner not less than two days in advance of the proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's and Owner's written permission.

B. Nonsmoking Building: Smoking and smokeless tobacco will not be permitted within the new construction after floor slabs are poured.

2.9 OWNER'S OCCUPANCY REQUIREMENTS

A. Owner Occupancy: Owner will occupy adjacent parking lots during entire construction period. Cooperate with Owner during construction operations adjacent to or near the existing building and parking to minimize conflicts and facilitate Owner usage. Perform the Work so as not to

interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.

B. Maintain access to existing walkways and other adjacent occupied or used facilities. Do not close or obstruct walkways or other occupied or used facilities without written permission from Owner and authorities having jurisdiction. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

C. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to place and install equipment in completed areas of building, before Substantial Completion, provided such does not interfere with completion of the Work. Such placement of equipment shall not constitute acceptance of the total Work.

2.10 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.

B. 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. Abbreviated Language: Language used in the Specifications another Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the

   Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

   a. 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.

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 01011 - CONTINGENCY ALLOWANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND GENERAL INFORMATION

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

PART 2 - CONTINGENCY ALLOWANCES

2.1 BASE BID PROPOSAL

A. The General Contractor shall include the following sums:

1. **Fifty Thousand Dollars ($50,000.00)** as a contingency to cover unforeseen conditions or minor changes that are necessary to correct or supplement the work as detailed in the Contract Documents.

2. **Thirty Thousand Dollars ($30,000.00)** as a contingency to cover the design and Installation of a complete **Emergency Communication Enhancement** System as stated on the Electrical Drawings.

2.2 The Contractor shall include in his bid proposal(s) all costs of office, job supervision, overhead, profit, and bond on these Contingency Allowances, because no such costs will be paid to Contractor for work performed under these Contingency Allowances. Only the direct costs of performing work under this provision shall be paid under and charged against the Contingency Allowance; such cost includes costs of materials and delivery, installation labor, payroll taxes and insurance, equipment expense, and the cost of subcontracted work (subcontractor's cost may include a maximum of 15% mark-up for overhead and profit).

PART 3 – AUTHORIZATION OF CONTINGENCY ALLOWANCES

3.1 After unknown conditions are identified and examined and the scope of work and method of repair determined, or request for a proposal to cover additional work has been issued by the Owner, the Contractor shall submit a proposal for such work to the Architect for the Owner's approval. If the Owner approves of such proposal, he will issue written authorization to the Contractor to perform the work and charge the related costs to the Contingency Allowance. At the Owner's option, work performed under this provision may be ordered done on a time and material basis, in which case; the Contractor shall keep accurate records of all time and materials used and submit such records to the Architect for his approval at the end of each day's work.

3.2 An accounting of the costs charged against this Contingency Allowance shall be mutually maintained by the Contractor, Architect, and Owner throughout the course of the project. Any of this Contingency Allowance not spent shall be credited to the Owner by Change Order at close out of the project. Refer to Contingency Allowance Form attached to this Section.

3.3 Provide for payment.

A. The Contractor shall include a line item in the *Schedule of Values* entitled "Contingency Allowance". The estimated value of work completed pursuant to fully executed Contingency Allowance Authorizations may be included in the Contractor's monthly Applications for Payment. Payments under this Contingency Allowance shall not exceed the net, total of fully executed

Contingency Allowance Authorizations.

3.4 CONTINGENCY ALLOWANCE AUTHORIZATION FORM

Form to be filled in its entirety.

To: Lathan Mckee, Architects

From: _____
Company

Project: _____

_____
Address

_____

_____
Contact and Email

Project Number _____

Date: _____

Building Commission Number: _____

Authorization Number: _____

In accordance with Specification Section 01011 – CONTINGENCY ALLOWANCE, the Contractor [ ] is hereby authorized to proceed with the changes in Work as are described below and is to be paid for the performance of these changes as provided in Specification Section 01011. This Authorization shall become effective when it is signed by the Contractor and the Owner's representative and it is understood and agreed that the amount(s) stipulated below constitute full compensation for these changes in Work.

TOTAL AMOUNT OF THIS AUTHORIZATION	$

ORIGINAL AMOUNT OF THE CONTINGENCY ALLOWANCE	$
NET TOTAL OF PREVIOUS AUTHORIZATIONS	$
PREVIOUS REMAINING CONTINGENCY ALLOWANCE	$
TOTAL AMOUNT OF THIS AUTHORIZATION	$
CONTINGENCY ALLOWANCE REMAINING AFTER THIS CONTINGENCY	$

Recommended By:	Authorized By:	Accepted By:
_____	_____	_____
Architect	Owner	Contractor

END OF SECTION

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Section 01600 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

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

1.4 PROPOSAL REQUESTS

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

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

2. Within time specified in ASI after receipt of ASI, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

e. Include data as needed to validate material costs

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

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

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

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive, “CCD”: Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Construction Change Directive contains a complete description of change in the Work.

PART 2 – NOT APPLICABLE

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    a. Application for Payment forms with Continuation Sheets.
    b. Submittals Schedule.
    c. Contractor's Construction Schedule.
2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:
    a. Project name and location.
    b. Name of Architect.
    c. Architect's project number.
    d. Contractor's name and address.
    e. Date of submittal.
2. Submit draft of ABC Form C-11.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value.
        1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate listing on Application and Certificate for Payment (Standard ABC Form C-10) for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or evidence of bonded warehousing.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Unit Costs: Provide a separate line item in the Schedule of Values for each unit cost. Line-item to show value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
    1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

B. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the 23rd of the month.

C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
    1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
    2. Include amounts of Change Orders issued before last day of construction period covered by application only after all agency approvals.

D. Transmittal: Submit 6 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
    1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

E. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
    1. List of subcontractors.
    2. Schedule of Values.
    3. Contractor's Construction Schedule (preliminary if not final).

4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.

F. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
   1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
   2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

G. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
   1. Evidence of completion of Project closeout requirements.
   2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
   3. Updated final statement, accounting for final changes to the Contract Sum.
   4. Certificate of Substantial Completion (Standard ABC Form C-13, August 2001)
   5. Form of Advertisement for Completion (Standard ABC Form C-14, August 2001)
   6. Evidence that claims have been settled.
   7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
   8. Final, liquidated damages settlement statement.

PART 2 – NOT APPLICABLE

PART 3 – NOT APPLICABLE

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

B. Related Sections include the following:

1. Division 1 Section 01290 "Payment Procedures" for submitting the Schedule of Values.
2. Division 1 Section 01310 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 1 Section 01330 "Submittal Procedures" for submitting schedules and reports.
4. Division 1 Section 01322 "Photographic Documentation" for submitting construction photographs.
5. Division 1 Section 01400 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

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

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Architect's final release or approval.

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

C. Daily Construction Reports: Submit two copies at weekly intervals.

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

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

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

G. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Verify availability of qualified personnel needed to develop and update schedule.
2. Discuss any constraints.
3. Review time required for review of submittals and re-submittals.
4. Review requirements for tests and inspections by independent testing and inspecting agencies.
5. Review time required for completion and startup procedures.
6. Review and finalize list of construction activities to be included in schedule.
7. Review submittal requirements and procedures.
8. Review procedures for updating schedule.

1.4 COORDINATION

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

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

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

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

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
2. Initial Submittal: Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

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

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

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

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

1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and re-submittal times indicated in Division 1 Section 01330 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than 14 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions, if any, and show how the sequence of the Work is affected.

E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 1 Section 01290 "Payment Procedures" for cost reporting and payment procedures.
2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be broken down within principal contracts in amounts typically not greater than $30,000, but in no case greater than 5 percent of the Contract Sum.
3. Each activity cost shall reflect an accurate value subject to approval by Architect.
4. Total cost assigned to activities shall equal the total Contract Sum.

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

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

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

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

C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost-and resource-loaded, time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
   a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

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

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and commissioning.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, timescaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.

E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Principal events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the Schedule of Values).

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

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

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value,and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
   a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
   b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

A. 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. Approximate count of personnel at Project site by trade.
3. Equipment at Project site.
4. Material deliveries.
5. High and low temperatures and general weather conditions.
6. Accidents.
7. Meetings and significant decisions.
8. Unusual events (refer to special reports).
9. Stoppages, delays, shortages, and losses.
10. Meter readings and similar recordings.
11. Emergency procedures.
12. Orders and requests of authorities having jurisdiction.
13. Change Orders received and implemented.
14. Construction Change Directives and Architect Supplemental Interpretations (Instructions) received and implemented.
15. Services connected and disconnected.
16. Equipment or system tests and startups.

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

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

2.5 SPECIAL REPORTS

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

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

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

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

1. The revised schedule should be updated immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting, no later than three days after the progress meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Architect, Owner, 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. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01322 - PHOTOGRAPHIC 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 the following:

1. Preconstruction digital video.
2. Periodic construction photographs.

1.3 SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each digital photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.

B. Digital Construction Photographs: Submit one print of each digital photographic view within seven days of taking photographs.

1. Format: Digital.
2. Identification: The following information is required on each USB Drive(s) submitted:
    a. Name of Project.
    b. Name of Architect.
    c. Name of Contractor.
    d. Date photograph was taken if not date stamped by camera.
    e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    f. Unique sequential identifier.
3. Digital Images: Submit a complete set of digital image electronic files as a Project Record document on USB Drive(s). Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.

C. Digital Video: Submit one copy of each digital video within seven days of recording.

1. Identification: On each copy, provide an applied label with the following information:
    a. Name of Project
    b. Name of Architect.
    c. Name of Contractor.
    d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    e. Date digital video was recorded.
    f. Weather conditions at time of recording.
2. Transcript: To include an audio narrative with the following information as a minimum.
    a. Name of Project.
    b. Date digital video was recorded.
    c. Weather conditions at time of recording.

d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

PART 2 - EXECUTION

2.1 CONSTRUCTION PHOTOGRAPHS

A. Film Images:

1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.

2. Field Office Prints: Retain one set of prints of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Architect.

B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1. Date and Time: Include date and time in filename for each image.

2. Field Office Images: Maintain one set of images on USB Drive(s) in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.

C. Preconstruction Photographs: Before starting construction, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.

2. Take eight photographs to show existing conditions adjacent to property before starting the Work.

3. Take eight photographs of existing buildings either on or adjoining property in order to accurately record physical conditions at start of construction.

4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Periodic Construction Photographs: Take 12 color, digital photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

2.2 CONSTRUCTION DIGITAL VIDEO

A. Narration: Describe scenes on digital video by audio narration by microphone while video is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.

1. Confirm date and time at beginning and end of recording.

2. Begin each digital video with name of Project, Contractor's name, and Project location.

B. Preconstruction Digital Video: Before starting construction, provide digital video of the Project site and surrounding properties from different vantage points, as needed to properly record all preexisting site conditions and adjacent conditions of all roadways, drives, structures that will incur construction traffic.

1. Flag construction limits before recording construction video.

2. Show existing conditions adjacent to Project site before starting the Work.

3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of construction.

4. Show protection efforts by Contractor.

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The General Contractor shall use website software "**Submittal Exchange**" to conduct all submittal reviews in electronic format. **Paper format submittals will NOT be accepted**. All recordkeeping, date stamping, access controls, shall be **paid for by the Contractor** with access given to the entire Project Team. The software shall be capable of the following:

B. Costs:

1. The General Contractor shall include the full cost of Submittal Exchange project subscription in their proposal. **The Contractor shall cover the full cost of Submittal Exchange project subscription for the project. The Contractor contractually, shall be fully responsible for all costs required to maintain full functionality through the acceptance of ALL project closeout requirements and documents. *NO OTHER SOFTWARE WILL BE CONSIDERED.***
2. **Contact Submittal Exchange at subex-sales_ww@oracle.com or call 1-800-633-0738 to verify costs prior to bid.**
3. At the Contractor's option, training is available from **Submittal Exchange** regarding use of website and PDF submittals. Contact Submittal Exchange at 1-800-714-0024 ext. 2
4. Internet Service and Equipment Requirements:
   a. Email address and Internet access at the Contractor's main office.
   b. Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments.
5. The General Contractor is responsible for maintaining and keeping Submittal Exchange active throughout the entire project, including closeout documents.

C. Procedures:

1. Shop drawing and product data submittals shall be transmitted to Architect in electronic (PDF) format using **Submittal Exchange**, a website service designed specifically for transmitting submittals between construction team members.
2. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
3. The electronic submittal process is not intended for color samples, color charts, or physical material samples.
4. Submittal Preparation – the Contractor may use any or all of the following options:
   a. Subcontractors and Suppliers provide electronic (PDF) submittals to the Contractor via the **Submittal Exchange** website.
   b. Subcontractors and Suppliers provide paper submittals to the General Contractor who electronically scans and converts to PDF format.
   c. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.
5. The Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.

6. The Contractor shall transmit each submittal to Architect using the Submittal Exchange website, www.submittalexchange.com.
7. The Architect / Engineer review comments will be made available on the Submittal Exchange website for downloading. Contractor will receive email notice of completed review.
8. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
9. Submit paper copies of reviewed submittals at project closeout for record purposes in accordance with Section 01770 – Closeout Procedures.

D. Related Sections include the following:

1. Division 1 Section 01290 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. Division 1 Section 01320 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
3. Division 1 Section 01322 "Photographic Documentation" for submitting construction photographs and construction videotapes.
4. Division 1 Section 01770 "Closeout Procedures" for submitting warranties.
5. Division 1 Section 01781 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
6. Division 1 Section 01782 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Division 1 Section 01820 "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
8. Divisions 2 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

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

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

1.4 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings will, under certain circumstances described hereinafter, be provided by Architect for Contractor's use in preparing submittals.

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Submittals Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

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

1. Initial Review: Allow **14** business days for initial review of each digital submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Re-submittal Review: Allow **10** business days for review of each re-submittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow **10** business days for initial review of each submittal.
    a. Structural, mechanical, plumbing, electrical, civil, audio/visual, sound system, and kitchen equipment components are examples of the Work that require sequential review. Architect will advise if there are others.

E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings. Provide another area of this same size for the Architect to affix his stamp. Stamp includes the following four categories: Reviewed, Furnish as Noted, Rejected, Revise and Resubmit; the Architect will mark one or more of these categories and return submittal to Contractor.
3. Include the following information on label for processing and recording action taken:
    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.
        i. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.D.2.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 06100.D.2.R1 (R2, R3 etc. if necessary).
    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

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

G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810 or equivalent with at least the following information.
    a. Project name.
    b. Date.

c. Destination (To:).

d. Source (From:).

e. Names of subcontractor, manufacturer, and supplier.

f. Category and type of submittal.

g. Submittal purpose and description.

h. Specification Section number and title.

i. Drawing number and detail references, as appropriate.

j. Transmittal number, numbered consecutively.

k. Submittal and transmittal distribution record.

l. Remarks.

m. Signature of transmitter.

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

H. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.

2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked "Reviewed" or "Furnished as Noted".

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals with mark indicating "Reviewed" or "Furnished as Noted".

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: McKee & Associates CAD Files shall not be released.

1. Should the Contractor require CAD Files they are encouraged to seek PDF to CAD Conversion vendors and/or software.

PART 2 - PRODUCTS

2.1 DIGITAL ACTION SUBMITTALS

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

B. All submittals shall be sent to the Architect no later than 45 calendar days from “Notice To Proceed”.

1. Submittals shall be sent to the following email address: submittals@mckeeassoc.com.

C. Submittals regarding mechanical, plumbing, electrical and structural items shall be sent directly to the Engineer of record.

1. A digital copy of the transmittal shall be sent to the Architect at the following email address: submittals@mckeeassoc.com.

D. Product Data: Collect information into a single digital submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each the digital submittal to show which products and options are applicable.
3. Include the following information, as applicable:
    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Mill reports.
    j. Standard product operation and maintenance manuals.
    k. Compliance with specified referenced standards.
    l. Testing by recognized testing agency.
    m. Application of testing agency labels and seals.
    n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit digital copy of the Product Data, unless otherwise indicated. Mark up and retain returned digital copy as a Project Record Document.

E. Digital Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of professional engineer if specified.
    o. Wiring Diagrams: Differentiate between manufacturer-installed and field installed wiring.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Digital Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
3. Number of Copies:
    a. Submit each original digital drawing submittal (specifically prepared for the project). Do not include MSDS documentation in any submittal. Architect will retain marked-up copy for his records and will return 1 (one) digital marked-up copy to the Contractor.
    b. Submit digital copy (bound in sets) of hardware submittals, fixture schedules, manufacturers' data and all other submittals that have been prepared in an 11 inch by 17 inch or smaller format. The Architect will return 1 (one) digital copy set to the Contractor.
        i. Upon receipt of his digital marked up shop drawings/submittals, the Contractor shall make as many copies for distribution as he deems necessary, however he shall retain one copy to mark-up further to show any and all construction changes that modify the submittal in any form. This document(s) shall be turned over to the Owner at the end of the Project along with the Record Documents.

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

G. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:
    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of appropriate Specification Section.
3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. **Colors will not be approved until all color submittals are received by the architect.**
    a. Number of Samples: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return one submittal with options selected.
    b. All color submittals are due within 45 days of the Notice to Proceed.
    c. The architect will be allowed 15 days from the date of the receipt of the last color submittal to approve colors.
5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

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

i. Construct a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

ii. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

H. Interior Color Selections: Any submittals that are associated with the aesthetics of the interior design shall not be approved until all submittals associated with the interior design are in the Architect's possession.

I. Submittals Schedule: Comply with requirements specified in Division 1 Section 01320 "Construction Progress Documentation."

J. Application for Payment: Comply with requirements specified in Division 1 Section 01290 "Payment Procedures."

K. Schedule of Values: Comply with requirements specified in Division 1 Section 01290 "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

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

1. Number of Copies: Submit digital copy of each submittal, unless otherwise indicated.

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

3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section 01400 "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 1 Section, 01310 "Project Management and Coordination."

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

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

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

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

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

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

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer aAnd witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

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

N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section 01782 "Operation and Maintenance Data."

P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufactures. Include the following, as applicable:

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

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

1. Name, address, and telephone number of factory-authorized service representative making report.

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

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

T. Construction Photographs and Videotapes: Comply with requirements specified in Division 1 Section 01322 " Photographic Documentation."

U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Architect.
1. Architect will not review submittals that include MSDSs and will return the entire submittal for re-submittal.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit one copy of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each digital submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

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

3.2 ARCHITECT'S ACTION

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

B. Action Submittals: Architect will review each digital submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each digital submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. REVIEWED–Indicates that reviewed submittal is satisfactory.

2. REJECTED–Indicates submittal is not satisfactory and another properly prepared submittal of same or another product must be prepared and resubmitted.
3. FURNISH AS NOTED–Indicates submittal is satisfactory if the changes, modifications, notes, etc. marked by the Architect are made a part of the submittal.
4. REVISE AND RESUBMIT–Indicates although parts of the submittal are satisfactory, there are enough significant modifications that must be made to require the Contractor, subcontractor, supplier, and/or manufacturer to provide additional essential information to his submittal and then resubmit it to the Architect.

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

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

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

END OF SECTION

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections include the following:

1. Division 1 Section 01100 "Summary" for limitations on utility interruptions and other work restrictions.
2. Division 1 Section 01330 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
3. Division 1 Section 01700 "Execution Requirements" for progress cleaning requirements.
4. Divisions 2 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
5. Division 2 Section 02282 "Termite Control" for pest control.

1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Sewer connections will not be in place for most if not all of the duration of the project. When and if the off-site sewer is installed by others and sewer piping under this contract is installed, should the contractor decide to connect to the sewer he must pay all sewer use charges until the project is turned over to the Owner.

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

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

1.5 SUBMITTALS

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

1.6 QUALITY ASSURANCE

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

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

1.7 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use

as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

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

1. Minimum Requirement: One (1) 10 foot wide x 44 foot long unit required.

B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack board.
3. Drinking water and private toilet.
4. Coffee machine and supplies.
5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

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

1. Store combustible materials apart from building.

2.2 EQUIPMENT

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

B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

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

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

3.2 TEMPORARY UTILITY INSTALLATION

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

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Sanitary Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

2. Connect temporary sanitary sewer from construction office to a submerged temporary holding tank, as directed by authorities having jurisdiction.
3. Provide erosion control structures to drain storm water from site.

B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction from existing water lines in the street. Contractor shall pay for any metering costs and associated fees required by the City Water Department.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Toilets: Use of Owner’s existing toilet facilities will not be permitted.

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

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

F. Electric Power Service: Provide temporary electric meter power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Contractor shall be responsible for any charges associated with said service.
1. Install electric power service overhead, unless otherwise indicated.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.
1. Provide additional telephone lines for the following:
a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
2. At each telephone, post a list of important telephone numbers.
a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Architect's office.
e. Engineers' offices.
f. Owner's office.
g. Principal subcontractors' field and home offices.
3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities, or other suitable high speed internet connection.
1. Provide DSL in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide incombustible construction for offices, shops, and sheds located within construction area with good visibility of construction. Comply with NFPA 241.

2. Maintain support facilities until near Substantial Completion. Remove before Substantial

   Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

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

1. Protect existing site improvements to remain including curbs, pavement, and utilities.

2. Maintain access for fire-fighting equipment and access to fire hydrants.

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

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.

D. Project Identification and Temporary Signs: Erect Project identification, General Contractor's sign, Architect's sign and other signs as approved. Install signs where directed to inform public and individuals seeking entrance to Project. Subcontractor signs are not permitted.

E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

F. Temporary Stairs: Until permanent stairs are available, provide one temporary stair between floors, located near the center of the building.

G. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Division 1 Section "Summary."

B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 2 02100 Section "Site Preparation."

C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

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

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.

F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

1. Prohibit smoking in construction areas.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.

3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

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

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

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

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Carefully remove and turn over Architect’s sign to the Architect.

2. Where area is intended for landscape development, in an area that has been used as a compacted temporary road bed, remove soil and aggregate fill that do not comply with requirements for landscaping fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section 01770 "Closeout Procedures."

END OF SECTION

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and equal products.

B. Related Sections include the following:

1. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.

2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

3. Equal Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating equal products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.

2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.

b. Generic name used in the Contract Documents.

c. Proprietary name, model number, and similar designations.

d. Manufacturer's name and address.

e. Supplier's name and address.

f. Installer's name and address.

g. Projected delivery date or time span of delivery period.

h. Identification of items that require early submittal approval for scheduled delivery date.

3. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.

4. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified materials or products cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

j. Cost information, including a proposal of change, if any, in the Contract Sum.

k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.

b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

c. If Contractor's Substitution Requests are repeatedly (i.e. 3 times) submitted incomplete, i.e., no definitive response to items "a" through "l", the Architect will not consider any further Substitution Requests.

C. Equal Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of an equal product request. Architect will notify Contractor of approval or rejection of proposed equal product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

a. Use product specified if Architect cannot make a decision on use of an equal product request within time allocated.

D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section 01330 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

B. The Contractor MUST provide the Owner with a Certificate of Asbestos Free Building Materials at the end of the project certifying that all building materials incorporated, installed, and used during the construction process of the project by the Contractor or its Subcontractors of any tier are 100% asbestos free. Asbestos Free means containing 0% asbestos in any form. The Certificate of Asbestos Free Building Materials form is included in the project manual.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store materials in a manner that will not endanger Project structure.

3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.

4. Store cementitious products and materials on elevated platforms.

5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
9. Materials Stored Off Site: Unless otherwise provided in the Contract Documents, the

   Contractor’s cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

   a. The contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the off site location.
   b. A Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party.
   c. The Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner.
   d. The materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner.
   e. Compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner’s title to such materials and equipment or otherwise protect the Owner’s interest.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

   1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
   2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

   1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Warranty start for mechanical and electrical equipment being date of substantial completion.

D. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

   1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
   2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
   3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Equal Products" Article to obtain approval for use of an unnamed product.

E. Product Selection Procedures:

1. Products and Manufacturers: In particular instances there may only be a single product or manufacturer appropriate for use on the project, in which case where Specifications name a single product and manufacturer and say “no equal”, provide the named product.
2. Products and Manufacturers: When one or two products or manufacturers are specified and have the words “or approved equal”, the Contractor may propose to provide alternatives in the form of a Substitution Request which once reviewed by the Architect will be either accepted or rejected. If Substitution Request is submitted for approval 7 days prior to the receipt of bids and approved by the Architect, said approvals will be included in Addenda. Only those Substitution Requests listed as approved in Addenda may bid the project.
3. Products and Manufacturers: Where Specifications include a list of three (3) or more names of both products and manufacturers, provide one of the products listed that complies with requirements. No substitutions will be accepted.
4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or an equal product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
5. Visual Matching Specification: Where Specifications require matching an established Sample, product must comply with all requirements and must match Architect's sample. Architect's decision will be final on whether a proposed product matches.
    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product
6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

1.8 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution under the conditions set forth in this section under Product Selection Procedures, if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.

B. Conditions: Architect will consider Contractor's request for substitution under the conditions set forth in this section under Product Selection Procedures and when the following conditions are satisfied. If the following conditions are not satisfied,

C. Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution requires no or only very minor revisions (as determined by the Architect), to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - NOT APPLICABLE

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Related Sections include the following:

1. Division 1 Section 01310 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
2. Division 1 Section 01330 "Submittal Procedures" for submitting surveys.
3. Division 1 Section 01770 "Closeout Procedures" for submitting Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Qualification Data: For professional engineer.

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

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit two copies signed by professional engineer.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction

indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

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

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
   a. Description of the Work.
   b. List of detrimental conditions, including substrates.
   c. List of unacceptable installation tolerances.
   d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

2.2 PREPARATION

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

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on RFI, "Request for Interpretation."

2.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings,

in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required

dimensions.

3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

2.4 FIELD ENGINEERING

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

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

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

1. Record benchmark locations, with horizontal and vertical data on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

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

D. Final Property Survey: Submit a final property survey certifying exact locations of site improvements including building(s), parking lots, roadways and utilities including structure elevations, top and invert, distances from property lines, and with any variation from the original civil staking and layout and utility drawings identified.

2.5 INSTALLATION

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

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling unless shown otherwise on drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results.

D. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

2.6 OWNER-INSTALLED PRODUCTS

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

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

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Pre-installation Conferences: Include Owner's construction forces at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

2.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.

3. Containerize hazardous and unsanitary waste materials separately from other waste.

Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section 01400 "Quality Requirements."

2.9 PROTECTION OF INSTALLED CONSTRUCTION

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

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

2.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

B. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section 01290 "Payment Procedures."
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Mark the Architect’s punch-list so-as-to identify those items that are still outstanding and uncorrected at the time of submission.

1.6 WARRANTIES

A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for Project.

    a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

    b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

    c. Remove tools, construction equipment, machinery, and surplus material from Project site.

    d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

    e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

    f. Remove labels that are not permanent.

    g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

        i. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

    h. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

    i. Replace parts subject to unusual operating conditions.

    j. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

    k. Clean ducts, blowers, and coils if units were operated without filters during construction.

    l. Leave Project clean and ready for occupancy.

END OF SECTION

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

B. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Digital Record Drawings.
2. Digital Record Specifications.
3. Digital Record Product Data.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of digitally scanned marked-up Record Prints.

B. Record Specifications: Submit one copy of digitally scanned Project Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one digitally scanned copy of each Product Data submittal.

D. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one clean set of blue- or black-line white prints of the Contract Drawings and Shop Drawings and one copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.

B. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

1. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
2. Accurately record information in an understandable drawing technique.
3. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

C. Content: Types of items requiring marking include, but are not limited to, the following:

1. Dimensional changes to Drawings.
2. Revisions to details shown on Drawings.
3. Locations and depths of underground utilities.
4. Revisions to routing of piping and conduits.
5. Revisions to electrical circuitry.
6. Actual equipment locations.
7. Duct size and routing.
8. Locations of concealed internal utilities.

9. Changes made by Change Order or Construction Change Directive. (Posted on Documents.)
10. Changes made following Architect's written orders, i.e. ASIs. (Posted on Documents.)
11. Details not on the original Contract Drawings. (Posted on Documents.)
12. Field records for variable and concealed conditions.
13. Record information on the Work that is shown only schematically.
14. Changes made in response to Contractor’s questions, i.e. RFIs. (Posted on Documents.)

D. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.

E. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

F. Mark important additional information that was either shown schematically or omitted from original Drawings.

G. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable. Where posting is required, post on Drawing Set and in Specifications on sheets or pages adjacent to or on top of where modification applies.

H. Attachment method shall be taped at top only, so as to access original underneath.

I. Digitally scan all documents and provide on CD Rom to Architect.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications. Maintain one clean copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

B. Digitally scan all documents and provide on CD Rom to Architect.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

B. Maintain one clean set at the job site for the sole purpose of recording changes to the drawings and specifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications and Record Drawings where applicable.

C. Digitally scan all documents and provide on CD Rom to Architect.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours. Architect’s representative will review Record Documents with the project superintendent each month to determine to his satisfaction whether or not Record Documents are being kept up to date. Failure to do so will result in the delay of processing pay request until Record Documents are brought up to date.

END OF SECTION

SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after finalinspection.

1. Correct or modify each manual to comply with Architect's comments. Submit three copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE

Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual,

insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.

2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:
1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.

5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.

3. Identification and nomenclature of parts and components.

4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.

2. Troubleshooting guide.

3. Precautions against improper maintenance

4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

5. Aligning, adjusting, and checking instructions.

6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.

2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service: Some equipment and products require maintenance by the manufacturer, supplier or subcontractor, i.e., an authorized service representative, as part of the warranty. The General Contractor shall ensure that said maintenance work is done and provide copies of service reports to the Owner.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.

2. Comply with requirements of Record Drawings in Division 1 Section 01781 "Project Record Documents."

G. Comply with Division 1 Section 01770 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01820 - DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training digital media.

1.3 SUBMITTALS

A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one complete training manual for Owner's use.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section 01400 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Instructor: Engage a qualified instructor to prepare instruction program and training modules, and

to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Instructor shall demonstrate to Owner's personnel how to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION

SECTION 02100 - SITE PREPARATION

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 work of this section.

1.2 DESCRIPTION OF WORK

B. Perform site preparation work as shown and specified. Site preparation includes, but is not limited to the following:

1. Protection of existing trees to remain
2. Removal of trees and other vegetation.
3. Stripping and stockpiling of topsoil.
4. Clearing and grubbing.
5. Removing above grade improvements.
6. Removing below grade improvements.
7. Installation of erosion control devices.

1.3 JOB CONDITIONS

A. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing. Leave all protection in place and maintain until construction work has been completed and all danger of damage has passed. Protection shall be removed only after approval is given by Architect.

1.4 QUALITY ASSURANCE

A. The General Contractor shall obtain *(In accordance with ADEM Admin. Code Chapter 335-6-12)* an ADEM storm water permit from the State of Alabama. An NPDES construction site also includes construction sites, irrespective of size, whose stormwater discharges have a reasonable potential to be a significant contributor of pollutants to a water of the State, or whose stormwater discharges have a reasonable potential to cause or contribute to a violation of an applicable Alabama water quality standard as determined by the Department. The General Contractor shall include in Base Bid all permit fees associated to obtain this permit. The Contractor shall submit a Notice of Registration, the fee and develop a Construction Best Management Practices Plan (CBMPP) prior to construction and shall maintain all erosion control measures until the permit is relinquished.

A. The Contractor shall use care when working near existing and future installed Best Management Practice (BMP) structures to prevent damage to the structures resulting in erosion and storm water runoff containing silt and soil from the site. The Contractor shall walk the site and verify the condition of the BMP structures during the execution of the work. Any repair work that is deemed necessary as a result of damage caused by the Contractor shall be the responsibility of the Contractor and shall be performed prior to payment of the next scheduled payment application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Temporary Soil Erosion and Sediment Control Items: Items including silt fence, wattles, inlet protection, sand bags and other erosion control items are to meet the requirements of Section 665 of the Alabama Department of Transportation Standard Specifications for Highway Construction (ALDOTSSHC), latest edition.

PART 3 - EXECUTION

3.1 EROSION CONTROL

A. Prior to the starting of any work, install erosion control measures as required in the Erosion Control or Best Management Practice Plan. Maintain all erosion control measures in place during full construction period and until such time as the site is substantially vegetated. Install erosion control measures in accordance with Section 665 of the Alabama Department of Transportation Standard Specifications for Highway Construction (ALDOTSSHC), latest edition, and the manufacturer's recommendations. Inspection of the silt fence shall be daily, and repair or replacement must be made promptly as required. Any sediment collected by the erosion control measures must be removed when it reaches 6" in height. Erosion control measures shall be removed only after approval is given by the Architect. Removal of erosion control measures is to be carried out by the Contractor who installed the measures.

3.2 SITE CLEARING

A. General: Remove vegetation, improvements or obstructions interfering with installation of new construction and within limits indicated on the Drawings. Remove all demolished items from the site. Removal includes digging out stumps and roots. Carefully and cleanly cut roots and branches of trees indicated to be left standing where such roots and branches obstruct new construction.

B. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing. Completely remove stumps, roots and other debris protruding through ground surface. Do not grub inside the drip line of trees to remain. On site burning is not permitted.

C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 8" loose depth and thoroughly compact to a density equal to adjacent original ground.

D. Positive drainage must be maintained or installed by the Contractor to insure that storm water runoff flows to the proper drainage structure or swale.

E. Restore all areas disturbed by construction activities and which are outside the limits of clearing as indicated on the drawing to their original condition. The expense for this work will be borne by the contractor. The work must be in accordance with the directions of the Architect.

3.3 STRIPPING TOPSOIL

A. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2" in diameter, and without weeds, roots and other objectionable material. Strip topsoil to its full depth at all areas to be regraded, resurfaced or paved in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, stop topsoil stripping at drip line, unless directed otherwise, to prevent damage to main root system. Stockpile topsoil in storage piles in a location acceptable to the Architect. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust. Maintain topsoil storage piles separate from other stockpiled soil materials.

3.4 SITE IMPROVEMENTS

A. Remove above grade and below grade improvements necessary to permit construction, and other work as indicated. Abandonment or removal of certain underground pipe or conduits are shown on the civil drawings and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this section.

3.5 DISPOSAL OF WASTE MATERIAL

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated materials, trash and debris, and legally dispose of it off Owner's property site, in area approved by all local authorities and ADEM.

END OF SECTION

SECTION 02200 – EARTHWORK

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 work of this section.

1.2 DESCRIPTION OF WORK:

A. Extent of earthwork is indicated on drawings.

1. Rough grading
2. Preparation of subgrade for building slabs and walks is included as part of this work.
3. Drainage fill course for support of building slabs is included as part of this work.

B. Excavation for Mechanical/Electrical Work: Refer to Division 15 and 16 sections for excavation and backfill required in conjunction with underground mechanical and electrical utilities and buried mechanical and electrical appurtenances; not work of this section.

C. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

D. Testing and Inspection Service:

E. The **Owner** will select a firm for soil testing and inspection service for quality control testing during earthwork, and Owner to pay costs.

F. Retesting of rejected materials and installed work shall be done at the Contractor's expense.

G. Referenced Standards: Where the term "Referenced Standard" is used in these Project Specifications, it shall be interpreted as **referring to the current edition of "Standard Specifications for Highway Construction, 2018 or latest edition" of Alabama Department of Transportation "**. Referenced Divisions of the "Standard" are hereby made a part of this Project Specification insofar as they may be termed applicable. In no case will requirements for "Method of Measurement" and "Basis of Payment" be considered as applicable to this Project Specification.

1.3 JOB CONDITIONS

A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

B. Should uncharted or incorrectly charted, piping or other utilities be encountered during excavation, consult utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

C. Use of Explosives: The use of explosives is not permitted.

D. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1. Perform excavation within drip-line of large trees to remain by hand and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS [NOT APPLICABLE]

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to the start of excavation and fill placement, the site should be cleared of existing improvements. Additionally, remnant elements associated with previously demolished structures, should be removed. Demolition should include removal of pavements, slabs, and all below grade structures including basement slabs, foundations, and walls. Utility lines will require routing or removal, as appropriate.

B. Any existing fill materials that are encountered in the planned building area should be completely removed, plus 10 feet beyond.

C. Areas that are at final grade, or that will require new fill placement, should be evaluated through proofrolling, prior to new fill placement or construction.

D. Vegetation, topsoil, rootmat, and all organic materials should be completely removed from the site. Excavations resulting from demolition and vegetation removal should be backfilled in a controlled manner with engineered fill.

3.2 FILL PLACEMENT

A. All material used as structural fill should be relatively free of organics and other deleterious materials. Soil fill should exhibit a Liquid Limit less than 50, a Plasticity Index less than 30, and a maximum dry density of at least 100 pcf. Soil fill should contain no more than 30% rock, and individual rock fragments in the fill should be less than 4 inches in largest dimension.

B. Soil fill must be placed in an environment free of excess water. Therefore, free-draining granular material (such as ALDOT # 57 crushed aggregate) should be used as the initial lift(s) of fill in areas containing water seepage.

C. Soil fill should be placed in lifts not exceeding eight inches in loose measure. Individual lifts of fill should be moisture conditioned to with ± 2% of the optimum moisture content and compacted to a minimum of 98% of the Standard Proctor (ASTM D -698) maximum dry density.

D. Soil may require wetting or drying to achieve proper compaction. Thinner lifts and manually operated equipment will be required to achieve proper compaction in limited access areas such as utility trenches and around manholes and inlets.

E. Soil compaction testing should be performed during fill placement. Testing will give an indication of the contractor's performance with regard to soil density and moisture content requirements established in the project specifications. Compaction testing should be performed at random locations on each lift of fill placed to provide statistically relevant testing data. The frequency of density testing should be at least one test per lift for every 2,500 square feet of fill placed in building areas and 10,000 square feet in pavement and sidewalk areas (minimum of 3 tests per lift). Each lift of fill placed in utility trenches should be tested on 50-foot centers. A minimum of 3 tests should be performed on all fill lifts.

F. Following construction, the foundations and underlying soils should be isolated from sources of excess water. Grades adjacent to the structure should be adjusted so that surface water flows away from the foundations. In no case should water be allowed to pond over newly-constructed footings. Roof drains and downspouts from the new buildings should be directed away from the foundations. Additionally, soils adjacent to foundations should consist of properly compacted, engineered fill to minimize water infiltration. The on-site soils contained fine-grained particles and will be adversely affected by excess water.

G. To reduce the potential for water migration through the floor slab, ground-supported slabs should be underlain by a capillary break consisting of a minimum of 4 inches of compacted, free-draining, coarse, granular material (such as ALDOT #57 crushed stone). Depending on the type of floor coverings to be used, the owner may also elect install a vapor barrier typically consisting of 10 mil polyethylene sheeting. The sheeting will reduce the infiltration of water vapor through the slab and the potential for damage to floor coverings. Note, that the use of a vapor barrier will increase the potential for plastic shrinkage cracking during curing of the concrete slab.

3.3 EXCAVATION

A. Excavation is Unclassified, and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. Earth Excavation includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect/Engineer. Unauthorized excavation, as well as remedial work directed by Architect/Engineer, shall be at Contractor's expense.

D. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect/Engineer.

E. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect/Engineer.

F. Additional Excavation: When excavation has reached required sub-grade elevations, notify Architect/Engineer who will make an inspection of conditions.

G. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Architect/Engineer.

H. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

I. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.

J. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

K. Dewatering: See civil drawings for drainage plan recommendation for controlling ground water during initial construction phase. Prevent surface water from flowing into excavations and from flooding project site and surrounding area.

L. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

M. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.

N. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

O. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

P. Dispose of excess soil material and waste materials as herein specified.

Q. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.

R. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

S. Excavation for Pavements: Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

T. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations.

U. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.

V. Except as otherwise indicated, excavate for exterior waterbearing piping (water, steam, condensate, drainage) so top of piping is not less than 2'-6" below finished grade.

W. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.

X. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing.

1. Concrete is specified in Division 3.

Y. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect/Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

Z. Excavation for utilities shall conform to manufacturer's recommendations for the type material used.

AA. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.4 COMPACTION

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 698; and not less than the following percentages of relative density determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).

1. Structures, Building Slabs and Steps and Pavements: Compact top 6" of subgrade and each layer of backfill (not exceeding 8" maximum) or fill material to not less than 98% of maximum density.

2. Lawn or Unpaved Areas: Compact top 6" of subgrade and each layer or backfill or fill material to not less than 90% of maximum density for cohesive soils and 90% of relative density for cohesionless soils.

3. Walkways: Compact top 6" of subgrade and each layer of backfill or fill material to notless than 95% of maximum density.

C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.

D. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.5 BACKFILL AND FILL

A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

1. Utility Trenches backfill according to manufacturer's recommendation for the type material used.
2. In excavations, use satisfactory excavated or borrow material.
3. Under grassed areas, use satisfactory excavated or borrow material.
4. Under structures, building slabs, steps and pavements and after grading operations, thoroughly mix top 6" of subgrade and compact to a density not less than 98% of maximum density.
5. Under walks and pavements, use satisfactory excavated or borrow material, or combination of both.
6. Under building slabs, use drainage fill material.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of trash and debris.

C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

D. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

E. Placement and Compaction: Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers.

F. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

G. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

3.6 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

C. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.2’ above or below required subgrade elevations.

2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

3. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 0.10’ above or below required subgrade elevation.

D. Grading Surface or Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

E. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.7 BUILDING SLAB DRAINAGE COURSE

A. General: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Placing: Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

C. When a compacted drainage course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.8 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow approved testing laboratory to inspect and approve subgrades and fill layers before further construction work is performed.

1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), or ASTM D 2922 (nuclear method) as applicable.

2. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Architect/Engineer.

3. Paved Areas Subgrade: Make at least one field density test of subgrade for every 10,000 sq. ft. of paved area, but in no case less than 2 tests. In each compacted fill layer, make one field density test for every 10,000 sq. ft. of overlaying paved area, but in no case less than 2 tests

4. Building Slab Subgrade: Make at least one field density test of subgrade for every 2500 sq. ft. of paved area or building slab, but in no case less than 2 tests. In each compacted fill layer, make one field density test for every 2500 sq. ft. of overlaying building slab or paved area, but in no case less than 2 tests.

5. Foundation Wall Backfill: Take at least 2 field density tests, at locations and elevations as directed.

B. If in opinion of Architect/Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.9 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated materials, trash and debris, and legally dispose of it off Owner's property site, in area approved by all local authorities and ADEM.

END OF SECTION

SECTION 02282 - TERMITE CONTROL

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 work of this section.

1.2 SUMMARY

A. Provide soil treatment for termite control, as herein specified.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and application instructions.

1.4 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.

C. Use only termiticides which bear a Federal registration number of the US Environmental Protection Agency.

1.5 JOB CONDITIONS

A. Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

B. To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.6 SPECIFIC PRODUCT WARRANTY

A. Furnish written warranty certifying that applied soil termiticide treatment will prevent infestation of subterranean termites and that if subterranean termite activity is discovered during warranty period. Contractor will re-treat soil and repair or replace damage caused by termite infestation.

1. Provide warranty for a period of 5 years from date of treatment, signed by Applicator and Contractor. This includes all costs associated with re-inspections per the manufacturer’s requirements, re-treatment, repair and replace damage caused by termite infestation.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION

A. Use an emulsible concentrate termiticide for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Provide a solution consisting of one of the following chemical elements and concentrations:

1. Water based emulsion, uniform composition, synthetic dye to permit visual identification of treated soil, of a generic chemical type in compliance with state and federal law and regulations.

B. Solutions as recommended by Applicator and approved for intended application by jurisdictional authorities. Use only soil treatment solutions which are not injurious to planting or persons.

PART 3 – EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

B. Application Rates: Water to be added to solution at job site in the presence of field Superintendent. Apply soil treatment solution at a rate as recommended by the manufacture at the following locations:

C. Under slab-on-grade structures, treat soil before concrete slabs are placed, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab and around interior column footers.

D. Apply chemical solution to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab and around interior column footers.

1. Apply chemical solution as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply chemical solution to areas where fill is washed gravel or other coarse absorbent material.

E. Under crawl-space and basement structures, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures.

F. Treat soil under or around crawl-space structures as follows:

1. Apply chemical solution along inside of foundation walls, along both sides of interior partitions, and around piers and plumbing. Do not apply an overall treatment in crawl spaces.
2. Apply chemical solution for each foot of depth from grade to footing, along outside of foundation walls, including part beneath entrance platform porches, etc.
3. Apply chemical solution along the side and outside of foundation walls of porches.
4. Apply as an overall treatment, only where attached concrete platform and porches are on fill or ground.

G. At hollow masonry foundations or grade beams, treat voids.

H. At expansion joints, control joints, and areas where slabs will be penetrated, apply chemical solution.

I. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs when areas are covered by other construction.

J. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

END OF SECTION

SECTION 02514 - PORTLAND CEMENT CONCRETE PAVING

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 work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of Portland cement concrete paving work is indicated on drawings.

B. Paving work includes, but is not limited to the following:

1. Walks.
2. Ramps.
3. Steps.
4. Mechanical Pads.

C. Prepared subgrade is specified in Specification Section: "EARTHWORK".

D. Concrete and related materials are specified in Division 3 Specifications.

1.3 QUALITY ASSURANCE

A. Referenced Standards: Where the term "Referenced Standard" is used in these Project Specifications, it shall be interpreted as **referring to the current edition of "Standard Specifications for Highway Construction" 2018 or latest edition of Alabama Department of Transportation**. Referenced Divisions of the "Standard" are hereby made a part of this Project Specification insofar as they may be termed applicable. In no case will requirements for "Method of Measurement" and "Basis of Payment" be considered as applicable to this Project Specification.

B. Testing and Inspection:

1. Testing and Inspection Services: The **Owner** will engage and pay for testing and inspection services, to include testing soil materials proposed for use during paving operations.
2. Field tests will be performed in conjunction with a proof rolling inspection of the prepared subgrade to verify that existing subgrade conditions are similar to those assumed in the design and therefore adequate for support of the pavement system.

C. Do not change source or brands of material during the course of the work.

1.4 INSPECTION AND APPROVAL OF WORK

A. Before commencement of work, Contractor shall coordinate with the Architect to arrange for inspection and approval of initial installation of slabs-on-grade. The approved initial installations shall serve as the standard to which all subsequent work shall adhere.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT CONCRETE

A. Dumpster Pad: After subgrade is approved, place 6" of 4000 psi concrete (550 psi flexural strength) at the dumpster pad and place 6" of 4000 psi concrete at a 20' approach apron in front of the dumpster pad.

B. Curbs: shall be constructed to details shown on the drawings with uniform slopes for drainage as indicated, providing for expansion joints at 10' intervals. Form all radii as shown and tool exposed edges of all curbs.

C. Concrete walks:

1. Concrete walks shall be poured 4" thick with expansion joints every 30 feet **MAXIMUM**.
2. Provide sawn joints ¼" wide x ¾" deep where indicated on drawings.
3. Score walks with tool every 6' or as indicated on drawings.
    a. Contractor may also use sawn joints at locations indicated to be scored.
4. Light broom finish all walks.

    Pitch 2% Maximum, 1% Minimum to side for surface drainage.

    Concrete walks shall be reinforced with 6 x 6 #10/10 mesh unless noted otherwise.

    a. Contractor may use fiber mesh reinforcement in lieu of wire mesh at walks.

D. Pad for Condenser or Transformer: 4" thick concrete slab installed over compacted bed. Edges neatly tooled. Verify exact elevation, size and location with HVAC and/or electrical contractor and architect.

2.2 MATERIALS - CONCRETE

1. Concrete shall be plant or transit mixed having a minimum of 28 day strength of 4000 psi (550 psi flexural strength), maximum 4″ slump. Proportioning and control of the mix shall be as required under the concrete section of these specifications.

2.3 MATERIALS - REINFORCING

1. Fiber Reinforcement:
    a. Fiber Force 500 (Fibril Pro) Micro synthetic Fiber Reinforcement by ABC Polymer Industries or Equal.
    b. Add to concrete mix at 1.5 pounds per cubic yard of concrete.
    c. Finishing: Broom finish; pull broom in one direction such that fibers lay down.
    d. Locations for Use: All concrete sidewalks, paving and handicap ramps.
2. Steel reinforcement if required shall be 6 x 6 #10/10 W.W.M. unless noted otherwise.
3. Expansion joint material shall be premoulded treated fibre 1/2" thick.

PART 3 – EXECUTION

3.1 CONCRETE FORMWORK

A. Execute construction of concrete formwork in accordance with the "Referenced Standard".

3.2 CLEANING UP

A. Remove all surplus materials, rubbage, cartons and other debris resultant from work of this Section and haul off site. Repair damage resulting from paving operations. Leave entire work in broom-clean condition.

END OF SECTION

SECTION 02660 - WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 SCOPE OF WORK

A. The work includes construction of the water distribution system including fire lines as shown on the Drawings.

B. Testing and disinfection of the installed system shall be incidental to the work.

1.3 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state of federal authorities having jurisdiction.

B. Meet all requirements of the Local Water Authority and be subject to review by System inspectors.

1.4 SITE CONDITIONS

A. Coordinate water distribution system with pavement construction.

B. Install water mains when grade is within 6 in. of final grade.

C. Coordinate the Work with the Local Water Authority and pay all tap fees assessed (to include valves, backflow preventers, vaults, etc.) for portions of the Work completed by the Utility Provider.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water Main Piping:

1. Water Service Piping: Ductile iron pipe or PVC pipe.
2. Ductile Iron Pipe:
    a. Manufactured in accordance with AWWA C-151, latest revision, Class 50, min.
    b. Standard cement-lined and seal-coated with an approved bituminous seal coat in accordance with AWWA C-104, latest revision.
    c. Approved push-on, conforming to AWWA C-111, latest revision.

B. PVC Pipe:

1. Constructed to meet the requirements of U. S. Department of Commerce Product Standard PS 22-70, and bear the National Sanitation Foundation Testing Laboratories, Inc., seal for potable water.
2. For PVC piping less than 4” - Schedule 40, PVC, minimum; 150 psi minimum working pressure
3. 4” or greater shall be C900 PVC piping.

C. Fire Line:

1. Fire line shall be C900 PVC piping. Encasement shall be used under drive areas.
2. Connection to Main: Each hydrant shall be connected to the main pipe with a 6-inch ductile iron branch. Each hydrant shall be controlled by an independent 6-inch gate valve.

D. Fire Hydrants:

1. All hydrants shall be Mueller Company, M & H, or an approved equal. Fire hydrants shall be equipped with traffic break away feature. Hydrants shall be painted in accordance with the requirements of AWWA C502.

E. Water Main Fittings:

1. Ductile iron fittings shall be provided in locations as shown on the plans or in locations deemed necessary by the Engineer. Ductile iron fittings 12" and smaller shall be rated for 350 psi working pressure. Fittings shall be manufactured in accordance with AWWA C153 and provided with mechanical joints. All fittings shall be provided with a thin cement lining in accordance with AWWA C104.

2. PVC Fittings: Fittings For PVC Water Mains Smaller Than 6 In. In. Dia.: As recommended by the manufacturer of the pipe furnished, suitable for use under the conditions specified for the pipe, with ring-tite or fluid-tite bells or spigots at all ends for jointing.

F. Valves and Boxes:

1. Cast Iron Valve Boxes shall be provided for all valves installed vertically and shall consist of a base covering the operating nut and head of the valve, a vertical shaft of at least 5 ¼" in diameter and a top section extending to a point even with the finish ground surface, provided with a cast iron cover marked "WATER." The valve box shall be placed concentrically over the operating nut. Precast concrete collars shall be provided around each valve box.

2. Valves 2" and Larger: Cast iron gate valves, AWWA type, the standard product of a recognized valve manufacturer such as Mueller, Iowa or M & H, constructed with an interchangeable parts system, with parts readily available, to meet the following requirements:

   a. Iron body, bronze-mounted.

   b. Double disc, parallel seat "O" ring seal.

   c. 150 psi, min., working pressure.

   d. Counterclockwise (left) opening.

   e. 2 in. operating nut.

   f. Non-rising stem.

   g. Joints to be as required for pipe to be connected to.

3. Valves 2" and Smaller: Brass or bronze gate valves, conforming to Federal Specification WW-V-76.

4. Underground Valves: Two-piece, screw type, adjustable to suit the depth of bury and type of valve, with a min. shaft dia. of 5-1/4 in.

5. All mechanical joint valves and fittings shall be restrained by MEGALUG series 1100 restraint devices.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Line and Grade: Lay and maintain to the required lines and grades; with fittings, valves and hydrants at the required locations; and with joints centered and spigots plumb; and with all valve and hydrant stems plumb.

B. Encasement: Piping under paved drive shall be encased with welded steel pipe casing.

C. Laying Pipe:

1. General: Before lowering pipe into trenches, grade the bottom of the ditch so that when pipe is in the ditch it will have a bearing for its entire length. Examine the pipe for defects and clean the inside. After placing pipe in ditch, wipe the bell, gasket, and spigot free from all dirt, sand and foreign material. Apply a film of lubricant to the gasket and spigot. Enter the plain

end into the socket after which force the pipe into the socket until it makes contact with the bottom of the socket.

2. A minimum of five (5) feet horizontal separation shall be used when installing water main or piping within areas of sanitary sewer lines. When the proposed water main or piping is required to cross sewer mains, the contractor shall encase the water main carrier pipe with a continuous pipe (sleeve or casing) of sufficient length, located such that a minimum five (5) foot horizontal separation exists between each end of the casing pipe and the sewer main. Where possible, water main shall be a minimum of 18 inches above the top elevation of the sewer main.

3. No. 12 THW copper locator wire shall be placed in the trench, 12 inches above the water mains and all service piping.

4. Trench Water: At times when pipe laying is not in progress, close the open ends of pipe by approved means, and permit no trench water to enter the pipe.

D. Cutting Pipe: Cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damage to the pipe.

E. Direction of Laying: Unless otherwise directed, lay pipe with bell ends facing in the direction of laying. For lines on an appreciable slope, face bells upgrade.

F. Permissible Deflections: Wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructing, to plumb stems, or where long radius curves are permitted, deflect as recommended by the manufacturer of the pipe.

G. Unsuitable Conditions: Lay no pipe in water or when the trench conditions or weather is unsuitable for such work.

H. Provide ground cover of 3 ft. min.

I. Setting Appurtenances:

1. Valves and Fittings: Set gate valves and pipe fittings to new pipe in the manner previously specified for cleaning, laying and jointing pipe.

2. Valve Boxes: Firmly support cast iron valve boxes and maintain centered and plumb over the wrench nut of the gate valve, with box cover flush with the surface of the finished pavement or at such other level as may be directed.

3.2 FIELD QUALITY CONTROL

A. Hydrostatic Tests: Pressure During Test: After the pipe has been laid and partially backfilled as specified, pressure test all newly laid pipe, or any valved section of it, in accordance with Local required procedures.

3.3 CLEANING AND DISINFECTION

A. Clean out and thoroughly flush the water distribution system piping and leave free from foreign materials of any sort prior to sterilization.

B. Disinfect in accordance with Local required procedures and AWWA Standard C-651, latest edition.

END OF SECTION

SECTION 02720 - STORM SEWERS

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 work of this section.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state or federal authorities having jurisdiction.

B. All locations including total jobsite: All storm drainage shall be in accordance with Local Requirements.

1.3 SUBMITTALS

A. Submit manufacturer's data, test reports, material certifications as required.

1.4 SITE CONDITIONS

A. Protection of Existing Utilities: Protect existing power lines, water mains, gas lines, telephone lines and other utilities. Should any functioning underground utilities be uncovered during the Work, advise for determination as to whether or not they are to be removed. Repair any damage to utility lines and restore service to original condition.

B. Coordination and Scheduling of Work:

1. Coordinate work with earthwork operations to avoid interference. Protect established construction stakes.

2. Establish and maintain center-lines, grades and elevations.

3. Construction of new sewers and drainage systems shall proceed as early in construction program as possible. Maintain adequate drainage of the project area at all times. Prevent flooding of adjacent roads and private properties.

C. Temporary Drainage: Wherever possible, construct new sewers and inlets to serve the various drainage areas, and place in service. Where this is not possible, provide temporary drainage facilities as required. These may include temporary connections into completed sewers, or such other means as the circumstances may require.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Storm Drain Pipe Materials:

1. The Contractor shall have the following options for pipe material:

a. Class III reinforced concrete, meeting the requirements of ASTM C76 with tongue and groove joints unless indicated otherwise in the drawings.

b. Contech A-2000 PVC Pipe.

c. ADS N-12 HDPE

2. Use ductile iron where indicated on the drawings.

1. Inlet Drains:

a) Inlet drains and all accessories shall be equal to Nyloplast meeting ASTM F-477, as indicated on the drawings.

B. PVC Downspout Boots:

1. Configuration: Inside top bell shall be sized as required to connect to specified metal downspouts. Length shall be sized as required to connect to drain line run to storm sewer as indicated on the drawings.
2. Material: Polyvinyl Chloride (PVC).
3. Finish: Exposed to be painted.
4 Color: To be selected by Architect.
5. Accessories:
    a. Stainless steel fasteners for mounting onto building wall.

C. Appurtenance Material:

1. Brick:
    a. Clay or Shale Brick: Comply with ASTM C 32 for Sewer Brick and Manhole Brick, grade as selected.
    b. Concrete Masonry Units: Comply with ASTM C 139.
2. Mortar: Comply with ASTM C 270, Type M, for pipe joints and man- hole and inlet brickwork.
3. Concrete:
    a. Concrete for use in precast concrete catch basins, curb inlets, drop inlets and manholes shall be 3000 psi at age 28 days.
4. Reinforcement: Comply with ASTM A 615.
5. Castings: Comply with ASTM A 48, grey cast-iron.
6. Riprap: Riprap shall be Class I conforming to Section 814 of the State of Alabama Highway Department Standard Specifications.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Storm Drainage System: Construct drainage structures and appurtenances in accordance with applicable standard drawings and construction details shown on the Drawings.

B. Lay all pipe in an open trench of dimensions as given below:

1. Lengths of storm drain pipe shown on the Drawings are approximate distances center-to-center of structures. Install pipe based on actual field measurements.

C. Excavation:

1. Excavation is open cut. The top portion of trenches may be excavated as required by the Contractor to any width which will not cause damage to adjacent structures. The lower portion of the trench, to a height of 1 ft. above the top of the pipe shall not exceed 18 in.

   greater than the pipe dia.
2. All excavation shall be prosecuted in accordance with requirements of OSHA "Safety and Health Regulations for Construction".
3. When sheeting or shoring is used, widths may be increased by the thickness of the timbers. All protective measures required are the responsibility of the Contractor and shall be provided at the Contractor's expense.
4. Carefully shape the bottom of trenches to conform to and support the lower 1/4 of the periphery of the pipe barrel. At the Contractor's option, trenches may be excavated slightly over depth, and then the pipe bed may be constructed of approved granular material,

thoroughly tamped and carefully shaped to conform to and support the lower 1/4 of the periphery of the pipe barrel. Where rock is encountered, remove to a depth of 6 in. below the pipe and replace with an approved granular material.

5. Where suitable material, such as muck, is encountered at or below invert elevation during excavation, remove and replace with suitable material, or stabilize by the addition of a granular material.

D. Pipe Laying:

1. Proceed upgrade where practicable. Lay pipe shall true to grade and line with a straight and uniform invert. Do not lay pipe in a wet or muddy trench. Dewater trenches as required with firm, smooth and properly shaped bed as specified.
2. Lay corrugated metal pipe so that if invert paving has been damaged, repair with an asphaltic compound to the satisfaction of the Engineer.
3. Joints for reinforced concrete pipe shall be with sand-cement grout.

E. Backfilling:

1. Backfill with selected material, free from rock larger than 2 in. in size, or debris.
2. Carefully place backfill and tamp around and over the pipe to avoid displacement of the pipe or damage to the joints.
3. Place all backfill in 6 in. lifts and compact as required in EARTHWORK Section. Compaction methods shall be at the Contractor's option as long as the desired results are obtained; otherwise, the Architect may order changes in methods or equipment.

F. Appurtenances and Drainage Structures:

1. Furnish and install drainage structures as shown in detail on the Drawings. Install shaped inverts.
2. Fill all mortar joints full. Tool all joints.
3. Cut and grind all pipe, where cut at face of structure wall, smooth with the face of the wall. Pack full all joints around pipe and structure wall at the face of the wall with mortar.
4. Clean bottom of drainage structures of all debris, and wipe walls clean of mortar as work progresses.
5. Construct catch basin tops true to line and grade, and slope continuous with gutter.
6. Install cast iron steps in all structures over 4 ft. deep, installed 15 in. o.c. in a vertical direction. Cast iron steps and manhole rings and covers shall meet ASTM A 48.
7. Construct junction boxes with bottom as shown in details for drop inlets, catch basins or other structures. Construct tops to accommodate a standard manhole ring, and adjust over to grade.
8. Where indicated in the Storm Structure Schedule, drainage basins by Contech or Nylopast may be used.

3.2 ADJUSTING AND CLEANING

A. At completion, remove all excess materials, debris, etc. resultant from operations of this Section of Work.

B. Leave drainage systems clean and free from mud or debris of any kind. When looked through, each line between structures shall show a full circle of light; otherwise the Contractor shall be required to remove and replace the defective portion of the work, at the Contractor's expense.

END OF SECTION

SECTION 02730 - SANITARY SEWERS

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 work of this section.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

B. Sanitary sewer construction is subject to review and acceptance by the Local Sewer Department and shall meet their requirements.

1.3 SITE CONDITIONS

A. Coordinate sanitary sewer construction with grading operations to avoid deep trench conditions insofar as possible.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe: Type as shown Drawings.

1. PVC Pipe:

a. Gravity Pipe – Plastic pipe for gravity sewers, stacks and laterals, and fittings shall be unplasticized polyvinyl chloride (PVC), meeting or exceeding ASTM Specification D3034, latest edition, Classification SDR 35.

b. Force Main Pipe – PVC pipe for force mains shall conform to the requirements of ASTM D2241 for pressure pipe or AWWA C900. Pipe shall be Class 150 with a Standard Dimension Ration of 18 or heavier.

c. All sanitary sewer PVC pipe shall be either green or brown in color.

B. Appurtenances:

1. Manholes: Precast concrete units conforming to ASTM 478.

2. Castings: Grey cast iron conforming to ASTM A 48.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Trenching and Excavation:

1. Excavate in open trench to the width, depth and in the direction necessary for the proper construction of the pipe sewer according to the Drawing.

2. Shape the bottom of the trench so as to conform as nearly as possible to the outside of the pipe, particular care being taken to recess the bottom of the trench in such a manner as to relieve the bell of the pipe of all load.

3. Build pipe sewers in a trench, the width of which at the top of the pipe shall not exceed the external dia. of the bell of the pipe, plus 12 in. each side, unless otherwise directed by the Engineer, but in no case less than 24 in. in width.

4. All excavation shall be performed in accordance with requirements of OSHA "Safety and Health Regulations for Construction".

B. Backfilling:

1. The sanitary sewer pipe shall be bedded in a crushed stone bench bottom installed to a minimum depth below the pipe of six (6) inches. After the pipe is installed, the trench shall be backfilled with crushed stone to a depth of one-half the pipe diameter for depths of cut of 12 feet or less. For depths of cut greater than 12 feet the pipe shall be backfilled with crushed stone to a height of 6” above the top of the pipe.

2. No. 12 THW copper locator wire shall be placed in the trench, 12 inches above the sewer mains and all sewer service piping.

3. Backfill all trenches and excavation immediately after the pipes are laid therein unless other protection for the pipe line is directed. The backfilling material shall be selected and deposited with special reference to the future safety of the pipes. Solidly tamp clean earth, sand or rock dust abut the pipe up to the level of 6 in. above the top of the pipe, and carefully deposit in uniform layers, each layer solidly tamped or rammed with proper tools so as not to disturb or injure the pipe line. Mechanical means may be permitted for backfilling, provided the equipment meets the approval of the Architect. Faithfully ram or tamp the remainder of the backfilling of the trenches in layers of not more than 6 in. in depth with either approved mechanical or hand tamps. Compaction shall conform to the requirements of the EARTHWORK Section.

4. All backfilling material shall be free from rock, trash and debris.

C. Laying Pipe

1. Lay pipe with joints close and even, butting all around, special care being taken that there is no sagging at the hub, and that a true surface is given to the invert throughout the entire length of the sewer.

2. Water in Trenches: Do not use sewers for draining water from ditch. Provide and operate pumps, if necessary, to remove water from trench while pipe is being laid and joints made.

D. Jointing Pipe:

1. In jointing gasket pipe, clean both the bell and the spigot before the gasket is applied. Use the proper size gasket for each size of pipe, and lubricate only with a lubricant recommended by the manufacturer of the pipe. Insert the spigot end in the bell the proper distance, and take care to see that the pipe remains in this position.

2. Clean all joint material that may be left on the inside, and leave the pipe clean and smooth throughout. At every third pipe, fill around immediately after being properly placed and jointed to prevent the moving of joints.

3. Free the interior of the pipe of all dirt and superfluous material of every description, as the work proceeds.

E. Manholes:

1. Manholes shall be precast concrete conforming to ASTM 478. Shape inverts and build of concrete.

3.2 FIELD QUALITY CONTROL

A. Testing: Perform Required Test as required by Local Authority.

3.3 ADJUSTING AND CLEANING

A. Clean and clear sanitary sewers of materials of all kind.

END OF SECTION

SECTION 02810 - SODDING AND TOPSOIL

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 work of this section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sod:

1. Provide strongly rooted **419 Bermuda Sod**
2. Sod shall be not less than 2 years old and free of weeds and undesirable native grasses.
3. Only provide sod capable of growth and development when planted (viable, not dormant).
4. Provide machine cut sod of a uniform minimum soil thickness of 5/8 inch, plus thickness of top growth and thatch. Sod pieces to be consistent in size and shape.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Sodding shall be restricted to those as instructed or recommended by the local Cooperative Extension Agent except when special instructions to the contrary are issued in writing by the Architect.

1. The Contractor shall furnish, in writing to the Architect, those recommendations of the Extension Agent before proceeding with any operations.
2. Grassing also shall comply with State of Alabama Highway Department specifications, latest Edition.
3. Contractor shall water and maintain newly grassed areas until acceptable stand of grass is established and approved by the Architect.

B. Preparation of Subgrade Soil:

1. The subgrade soil in those areas to be sodded whether shown or not shown on the plans shall be loosened to a minimum depth of 3 inches and graded to remove all ridges and depressions so that it will be, after settlement everywhere parallel to and at the proper level to provide finished grades specified.
2. All stones over 1" in dimension, sticks, rubbish and other extraneous matter shall be removed during this operation.

C. Topsoil:

1. Contractor shall furnish and spread layer of topsoil over all areas.

   Topsoil shall be spread in loose layers to provide finished grades specified and shall have an equal depth of not less than 4" over the site after natural settlement and light rolling.

D. All areas shall be carefully graded and raked to accurate specified grades and uniform slopes following topsoil spreading. The surface, when finished and settled shall conform to required grades and shall be free from hollows and other inequalities, from stones over 1" in diameter, sticks and other debris, and shall be satisfactory to the Architect.

E. Initial fertilization of sodded area prior to sodding and following preparation, commercial fertilizer 4-10-10 or 4-12-12 shall be applied on all grass areas at the uniform rate of 20 pounds per 1,000 square feet each.

3.2 SODDING

A. Prepare all areas to receive sod.

B. **The Contractor shall fully sod all graded and disturbed areas, including the Contractors staging area and all areas disturbed by vehicular construction traffic, whether shown on plans or not.**

3.3 TOPSOIL

A. General:

1. Provide topsoil of natural, friable, fertile, fine loamy, soil possessing the characteristics of representative top soils in the vicinity which produces a heavy growth; free from subsoil, weeds, litter, clods, stiff clay, stones, stumps, roots, trash, toxic substances or any other material which may be harmful to plant growth or hinder planting operations.
2. The topsoil shall not be in a muddy or frozen condition. Topsoil shall be that material stripped and stockpiled, or as required to provide 4” of coverage.
3. The topsoil shall have a pH range of 5.9 to 7.0.
4. Limestone or aluminum sulfate (or acceptable substitute) may be used to adjust the pH of the topsoil to an acceptable level.

END OF SECTION

SECTION 02830 - TEMPORARY CHAIN LINK FENCING & GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Erection and maintenance of temporary chain link fencing and gates.

B. Refer to Section 01010, contractor to provide temporary fence layout and location of fence and gates.

1.2 RELATED DOCUMENTS

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

1.3 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Product Data: Include construction details, material descriptions, dimensions of individual components, and finishes for chain link fences and gates.

i. Fence, gate posts, rails, and fittings.

ii. Chain link fabric.

iii. Gates and hardware.

2. Test Reports: Field test result for compliance of installation of chain link fence and gates.

B. Informational Submittals:

1. Manufacturer’s recommended installation instructions.

2. Evidence of Supplier and installer qualifications.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Site in undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

1.5 SCHEDULING AND SEQUENCING

A. Install temporary fence and gates prior to beginning demolition work and/or new construction work

B. Complete necessary Site preparation and grading before installing chain link fence and gates.

PART 2 - PRODUCTS

2.1 MANUFACTURERE - Galvanized Steel Fencing: The following manufacturers’ products have been used to establish minimum standards for materials, workmanship and function:

A. Master Halco

B. Merchants Metal

C. Stephens Pipe and Steel, LLC.

D. Eagle Fences

E. Equal products of other manufacturers may be used in the work provided, such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 TEMPORARY CHAIN LINK FENCING

A. Unless otherwise indicated, type of temporary chain link fencing shall be as follows:

1. New materials or previously used salvaged chain link fencing in good condition.

2. Height: 8’-0” (minimum) unless otherwise indicated on drawings.
3. Posts: 2” min. galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings.
4. Fencing Fabric: 2” diamond woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.
5. Privacy Fabric: Temporary fencing shall be outfitted with privacy fabric.
    a. Color: Green
    b. Material Requirement: Polythylene, 4.9 oz/sq. yd., Burst Strength: 210 psi

B. Gates: Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site.
1. Fabricate of same material as used for fencing.
2. Vehicle gates:
    a. Minimum width: 20 feet to allow access for emergency vehicles.
    b. Capable of manual operation by one person.

PART 3 - EXECUTION

3.1 GENERAL- TEMPORARY CHAIN LINK FENCING

A. Installation of temporary fencing shall not deter or hinder access to existing and new hose connections and fire hydrants.
1. Maintain 3 feet diameter clear space around fire hydrants.
2. Where fire hydrant or hose connection is blocked by fencing, provide access gate.

B. Access: Provide gates for personnel, delivery of materials, and access by emergency vehicles.

C. Field verify gate locations with Architect.

3.2 INSTALLATION - FENCE

A. Chain link posts:
1. Post spacing shall be 12’ maximum if using prefabricated panels and 10’ maximum if wire tying mesh to posts.
2. End, Corner and Line posts shall be set in concrete **OR** post driven.
3. Gate posts: Use concrete footings and brace to provide rigidity for accommodating size of gate. Gate posts MUST be set in concrete.

B. Fabric: Leave approximately 2” between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.

C. Gates: Install with required hardware.

D. Wire Ties: 11 gage galvanized steel.

E. Tension Wire: 7 gage, galvanized coated coil spring wire, metal and finish to match fabric.

F. Concrete: Provide concrete consisting of portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28 day compressive strength of 3,000 psi using at least 4 sacks of cement per cu. yd., 1” maximum size aggregate, maximum 3” slump.

3.3 INSTALLATION - GATES

A. Chain link gates:

1. Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding or with special fittings and rivets for rigid connections, providing security against removal or breakage connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members maximum of 8’ apart unless otherwise indicated.
2. Provide same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretcher bars to gate frame at not more than 15” o.c.
3. Install diagonal cross-bracing consisting of 3/8” diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.

B. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASMT A 153, and in accordance with the following.

1. Hinges: Size and material to suit gate size, non-lift off type, offset to permit 180 degree gate opening. Provide 1½ pair hinges for each leaf over 6’ nominal height.
2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
3. Keeper: Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.
4. Double Gates: Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

3.4 MAINTENANCE

A. Maintain fencing in good condition. If damaged, Contractor shall immediately repair at no additional cost to owner.

3.5 FIELD QUALITY CONTROL

A. Post and Fabric Testing: Test fabric tension and line post rigidity according to ASTM F1916.

B. Gate Tests:

1. Prior to acceptance of installed gates, demonstrate proper operation of gates under each possible open and close condition specified.
2. Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.
3. Confirm that latches and locks engage accurately and securely without forcing and binding.

3.6 CLEANUP

A. Remove excess fencing materials, soil, concrete and any other debris from Site which resulted from installation of fences and/or gates.

END OF SECTION

SECTION 03310 – CAST-IN-PLACE CONCRETE

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 work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of concrete work is shown on drawings.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

1. ACL 301 "Specifications for Structural Concrete for Buildings".
2. ACI 318 "Building Code Requirements for Reinforced Concrete"
3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

B. Concrete Testing Service: The **Owner** will engage and pay a testing laboratory to perform material evaluation tests.

C. Materials and installed work may require retesting, as directed by Architect, at anytime during progress of work. Provide free access to material stockpiles and facilities. Retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.4 SUBMITTALS

A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joints systems, curing compounds, dry-shake finish materials and others as requested by Architect.

B. Shop Drawings Reinforcements: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement.

C. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

B. Use plywood complying with U. S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.

C. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

D. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed, unless otherwise noted.

B. Steel Wire: ASTM A 82, plain, cold-drawn, steel.

C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.

D. Supports for Reinforcement: Provide supports for reinforcement including 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, unless otherwise acceptable.

1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

2. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide support with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 3).

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type 1, unless otherwise acceptable to Architect.

1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.

B. Normal Weight Aggregate: ASTM C 33, and as herein specified. Provide aggregate from a single source for all concrete.

1. Do not use fine or coarse aggregates containing spalling-causing deleterious substances.

C. Water: Drinkable.

D. Air-Entraining Admixture: ASTM C 260.

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Air-Mix, Evclid Chemical Co.

b. Sika-Ai", Sika Corp.

c. Darex AEA, W. R. Grace

d. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

E. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1% chloride ions.

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Accelguard 80; Euclid Chemical Company

b. Pozzolith High Gally; Master Builders

c. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

F. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.1% chloride ions.

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Edoco 20006; Edoco Technical Products

b. Pozzolith 300-R; Master Builders

c. Eucon Retarder 75; Euclid Chemical Company

d. Daratard; W. R. Grace

e. Plastiment; Sika Chemical Company

f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

G. Certification: Provide admixture manufacturer's written certification that chloride ion content complies with specified requirements.

H. Calcium chloride or admixtures containing more than 0.1% chloride ions are not permitted.

2.4 RELATED MATERIALS

A. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:

1. Polyethylene sheet not less than 10 mils thick.

B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper

2. Polyethylene film.

3. Polyethylene-coated burlap.

D. Liquid Membrane Forming Curing Compound: Liquid type membrane forming curing compound complying with ASTM C 309, Type 1-D, Class A unless other type acceptable to Architect. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal. Equal to "Kure-N-Seal" - 30; Sonneborn-Contech

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Master Builders

b. Euclid Chemical Company

c. A.C. Horn

d. The Burke Company

e. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

E. Bonding Compound: Polyvinyl acetate or acrylic base, re-wettable type.

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Welcrete; Larsen Products

b. EucoWeld; Euclid Chemical Company

c. Hornweld; A. C. Horn

d. Sonocrete; Sonneborn-Contech

e. Acrylic Bondcrete; The Burke Company

f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

F. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

1. MANUFACTURERS: The following manufacturers' products have been used establish minimum standards for materials, workmanship and function:

a. Epoxtite; A. C. Horn

b. Sikadur Hi-Mod; Sika Chemical Corporation

c. Euco Epoxy 463 or 615; Euclid Chemical Company

d. Patch and Bond Epoxy; The Burke Company

e. Sure-Poxy; Kaufman Products, Inc.

f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

G. Subfloor Patching and Leveling**:** The following manufacturers' products have been used establish minimum standards for materials, workmanship and function:

1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

a. Ardex K-15; Ardex Engineered Cements 400 Ardex Park Drive Aliquippa, PA 15001; (724) 203-5000

b. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

PART 3 - EXECUTION

3.1 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 used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.

B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

C. Design mixes to provide normal weight concrete as indicated on drawings and schedules.

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; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.

E. Admixtures:

1. Use water-reducing admixture in all concrete for ease of placement and workability.

2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.

3. Use air-entraining admixture in all 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 of 6% with a tolerance of plus-or-minus 1-1/2%.

F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramps, slabs and sloping surfaces: 3" to 5".

2. Reinforced foundation systems: 2" to 5".

3. Other concrete: 3" to 5".

3.2 CONCRETE MIXES

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

2. When air temperature is between 85 degrees F and 90 degrees, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

3.3 FORMS

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

C. 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, off-sets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

D. 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, to prevent swelling and for easy removal.

E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set time to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

F. 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.

G. Form Ties: Factory-fabricated, adjustable-length, removable, or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is 1" inside concrete and will not leave holes larger than 1" diameter in concrete surface.

H. 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.

I. 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. Retighten forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.4 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. 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 as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.5 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 Architect.

1. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints.

B. Isolation Joints in Slabs-On-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, and elsewhere as indicated.

1. Joint filler and sealant materials are specified in Division-7 sections of these specifications.

C. Construction Joints in Slabs-On-Ground: Construct construction joints in slabs-on-ground to form panels of patterns no larger than 600 square feet and as shown and as detailed. An alternative control joint detail may be inserts 1/8" to 1/4" wide x 1/4 of slab depth.

1. Form contraction joints by inserting premolded plastic, hardboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris, fill groove with joint sealant.

2. Joint sealant material is specified in Division-7 sections of these specifications.

3.6 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work 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 thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.

1. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.7 PREPARATION OF FORM SURFACES

A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

C. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.8 CONCRETE PLACEMENT

A. Replacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately

before placing concrete where form coatings are not used.

1. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

B. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams of planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24"

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 recommended practices.

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 at least 6" 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 limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Bring slab surfaces to correct level with straightedge and strike-off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

3. Maintain reinforcing in proper position during concrete placement operations.

E. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40 degrees F uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F. and not more than 80 degrees F 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 place concrete when air temperature has fallen to or is expected to fall below 35° F.Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

F. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACE 305 and as herein specified.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. 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.

3. 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.

4. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

5. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.9 FINISH OF FORMED SURFACES

A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete such as waterproofing, dampproofing. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish: For formed concrete surfaces exposed to view provide smooth rubbed finish, not later than one day after form removal.

1. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. 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. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for randomly trafficked floor surfaces:

1. Specified overall values of flatness, F(F) 38: and levelness, F(L) 25: with minimum local values of flatness, F(F) 19: levelness, F(L) 13: for slabs on grade.

B. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementious finish flooring material, and as otherwise indicated.

C. Slope surface uniformly to drains where required. After leveling, roughen surfaces before final set, with stiff brushes, brooms or rakes.

D. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other

finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing membrane or elastic roofing, or sand-bend terrazzo, and as otherwise indicated.

1. After screeding consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

E. 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 surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Grind smooth surface defects which would telegraph through applied floor covering system.

F. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.

1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.

2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least seven (7) days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.

1. Provide moisture curing by one of the following methods or by a combination of the following methods:

a. Keep concrete surface continuously wet by covering with water.

b. Continuous water-fog spray.

c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

C. Provide moisture-cover curing as follows:

1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

D. Provide curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; 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 two hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

E. Do not use membrane curing compounds on surface which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp-proofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.

F. Curing Formed Surfaces: Cure formed concrete surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

H. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

I. Sealer and Dust-proofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.12 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of walls, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for twenty-four (24) hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided cutting and protection operations are maintained.

B. Formwork supporting weight of concrete, may not be removed in less than fourteen (14) days and until concrete has attained design minimum compressive strength of in place concrete by testing field-cured specimens representative of concrete location in members.

C. Form facing material may be removed four (4) days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.13 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in 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 joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to 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: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Reinforced Masonry: Provide concrete grout for reinforced masonry, masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

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 Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". 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 after 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 color surrounding. Provide test areas at inconspicuous location 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 satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.

1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

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, in addition to smoothness using a template having required slope.

1. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, 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 fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

4. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and exposed reinforcing steel with at least 3/4" clearance all around.

5. 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.

6. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than seventy-two (72) hours.

7. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

8. Repair methods not specified above may be used, subject to acceptance of Architect.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The Owner will employ and pay for a testing laboratory to perform tests and to submit test reports. The Contractor shall notify testing agency 24 hours in advance of requirements.

B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.

C. The Owner shall maintain equipment on site to cast cylinders, perform slump and air tests, and field cure specimens. Should the project testing agency be absent from the site, the Contractor will be responsible for performing the field tests below.

D. Sampling Fresh Concrete: ASTM C 172, except as modified for slump to comply with ASTM C 94.

1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
2. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, and when 80 degrees F. and above; and each time a set of compression test specimens made.
3. 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 except when field-cure test specimens are required.

E. Compressive Strength Tests: ASTM C 39; one set for each day's pour plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at seven (7) days, two specimen tested at twenty-eight (28) days, and one specimen retained in reserve for later testing if required. Minimum compressive strength of concrete shall be 3,000 psi at 28 days unless otherwise indicated.
   1. When frequency of testing will provide less than five (5) strength tests for a given class of concrete, conduct testing from at least five (5) randomly selected batches or from each batch if fewer than five (5) are used.
   2. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
   3. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
   4. Test results shall be reported in writing to Architect and Contractor within twenty-four (24) hours that tests are made. Reports of compressive strength 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, design compressive strength at twenty-eight (28) days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other non- destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

G. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
   1. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

SECTION 03950 - CONCRETE SEALER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Exposed concrete slabs where concrete sealer is indicated.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: Submit four samples of concrete sealer over concrete, 6 by 6 inches sample.

C. Manufacturer Certificates: Signed by manufacturers certifying that concrete sealer comply with requirements.

D. Qualification Data: For Installer.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.

F. Warranty: Special warranty specified in this Section.

G. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer with minimum five years documented experience.

1.4 PROJECT CONDITIONS

A. Limitations: Proceed with application only when the following existing substrate conditions permit sealer to be applied according to manufacturers' written instructions and warranty requirements:
   1. Ambient temperature is above 40 deg F.
   2. Concrete surfaces and mortar have cured for more than 28 days.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree to repair or replace materials that fail to maintain water repellency within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE SEALER

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
   1. Products:
      a. Curecrete Distribution Inc.; Ashford Formula.
      b. Burke by Edoco; Titan Hard.

c. ChemMasters; Chemisil Plus.
d. Euclid Chemical Company (The); Euco Diamond Hard.

2. Flammability: Self extinguishing.
3. Finish: Non slip finish. Coefficient of friction: 0.6 wet, 0.8 dry.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of concrete sealer.
   1. Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of concrete sealer.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of concrete sealer and to instruct Applicator on the product and application method to be used.

B. Concrete Sealer: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Do not apply to concrete that is less than number of days' old recommended by sealer manufacturer in writing.
   2. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

C. Apply on horizontal surfaces of indicated interior exposed concrete slabs not receiving other finishes.

3.3 CLEANING

A. Immediately clean concrete sealer from adjoining surfaces and surfaces soiled or damaged by concrete sealer application as work progresses. Repair damage caused by concrete sealer application. Comply with manufacturer's written cleaning instructions.

END OF SECTION

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of each type of masonry work is indicated on drawings and schedule.

B. Types of masonry work required include.

1. Concrete unit masonry.

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.

B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

D. Samples: Submit the following samples:

1. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.

2. Include size variation data verifying that actual range of sizes for brick falls within ASTM C652 dimension tolerances for brick where modular dimensioning is indicated. The grade shall be SW and the type HBS.

E. Field Constructed Mock-Up Panel: Prepare mock-up panel for the following types of masonry. Purpose of mock-up is further verification of selections made for color and finish under sample submittals and establishing standard of quality for aesthetic effects expected in completed work. Build mock-up panel to comply with the following requirements:

1. Locate mock-up panel on site where directed by the Architect.

2. Build mock-up panel of typical exterior masonry wall, approximately 4’-0” long by 4’-0” high, showing all typical components, connections, attachments to building structure and methods of installation.

3. Retain mock-up panel during construction as standard for judging completed masonry work. When directed, demolish mock-up panel and remove from site.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry materials to project in undamaged condition.

B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes. Store masonry units off the ground.

C. Store cementitious materials off the ground, under cover and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained.

E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.5 PROJECT CONDITIONS

A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Do not apply uniform floor or roof loading for at least 24 hours after building masonry walls or columns.

D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.

E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

F. Protect sills, ledges and projections from droppings of mortar.

G. Environmental Protection:

1. Maintain air temperature and materials to a minimum of 40 degrees F and a maximum of 90 degrees F prior to and during masonry work
2. Do not lay masonry units which are wet or frozen.
3. Remove masonry damaged by freezing conditions.

H. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements.

1. For units with surface temperatures above 32°F wet with water heated to above 70°F.
2. For units with surface temperatures below 32°F wet with water heated to above 130°F.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. **General:** Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.

1. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
2. Provide bullnose units for outside corners, except where indicated as square-edged.

B. **Concrete Block:** Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and under each form of block included, for weight classification.

1. Grade N
2. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8” high x thickness indicated.
3. Type I: moisture-controlled units.
4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
5. Hollow Loadbearing Block: ASTM C 90 and as follows:
   a. Weight Classification: Lightweight
6. All CMU sills shall be bullnose concrete block, unless another material is indicated on the drawings. If the sills are indicated to receive another material (ie: Solid Surface fabrication, wood, etc.) placed on top of the CMU sill, the CMU sill shall be straight edged concrete block units.

C. **Exterior Smooth and Split-Faced**:

1. Exterior units to be 16" long x 8" high x thickness indicated.
2. Block shall be as manufactured by “Block USA, Jefferson Series or approved equal.
3. Color to be selected by Architect after bid date from Manufacturer Premium Colors. If Architect chooses color of lesser value after Bid Process, Contractor shall issue a deductive Change Order for the difference.
4. Contractor shall erect panel prior to installation for Architects approval. All exterior smooth and split faced block shall be produced by the manufacture in a single run process.
5. Integral Water Repellent Admixture – CMU and Mortar. All exterior units shall be water repellant by using “dry block” integral admix as described below:
    a. Description: An integral liquid polymeric admixture mixed with concrete during production of CMU and mixed with mortar mix, which cross links and becomes permanently locked into the CMU and mortar to provide resistance to water penetration.
    b. Water Permeance: ASTM E 514m achieves Class E rating with no water visible on back of wall above flashing at end of 72 hours, not more than 25 percent of wall area above flashing damp at end of three days, and no leaks (a leak is a flow of water from flashing at a rate equal to or greater than 0.0132 gallons per hour) through wall at end of one day.
    c. Water Vapor Transmission: ASTM E 96, passes. Bond strength: ASTM E 72 and/or ASTM C 1072, minimum equal to bond strength without admixture.
    d. CMU Sampling and Testing: ASTM C 140 surpasses normal and medium weight CMU for compressive strength absorption, weight, moisture content, and dimensional stability.
    e. Water Mixability: fully dispersible in water
    f. Specific Gravity: Minimum 1.0
    g. Manufacturer: Forrer Industries – Dry-Block Water-Repellent Admixture or equal.
6. CMU Sills indicated on drawings are to be solid square edge CMU block in sizes as indicated on drawings.
7. Block Sealer – The interior face and exterior face (including mortar joints) of all units shall receive two (2) coats of polyurethane masonry sealer approved by block manufacturer.

2.2 MORTAR AND GROUT MATERIALS

A. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Atlas
2. Citadel
3. Lone Star
4. Magnolia
5. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. Masonry Cement: ASTM C 91.

1. Type S for CMU walls
2. Type N for Exterior Face and Accent brick – color pigment.

C. Hydrated Lime: ASTM C 207, Type S.

D. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

E. Water: Clean and potable.

2.3 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

A. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Dur-O-Wall, Inc.
2. Heckman Building Products, Inc.
3. Masonry Reinforcing Corp. of America.
4. National Wire Products Corp.
5. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.

C. Use individual galvanized steel metal ties installed in horizontal joints to bond wythes together

only where wood or metal stud backup occurs. Provide ties as shown, but not less than one metal tie for 4 sq. ft. of wall area spaced not to exceed 24" o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and space not more than 3'-0" apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24" o.c. vertically.

D. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 123, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.

E. Application: Use where indicated.

F. Joint Reinforcement: Provide truss-type, welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:

1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" else- where.

2.4 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet.
2. Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
5. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.
6. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
7. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.

8. 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.
9. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
10. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.

B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:

1. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:
   a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
   b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch thick coating of rubberized-asphalt adhesive.
   c. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
   d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
2. EPDM Flashing: Sheet flashing product made from ethylene-propylene-dieneterpolymer, complying with ASTM D 4637, 0.040 inch thick.

C. 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.

D. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship, and function:

1. Vinyl Sheet Flashing: (Thickness: 20 mils)
   a. Vi-Seal Plastic Flashing; Afco Products, Inc.
   b. BFG Vinyl Water Barrier; B.F. Goodrich Co.
   c. Nuflex; Sandell Manufacturing Co., Inc.
   d. Wascosea"; York Manufacturing, Inc.
   e. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. See drawings for locations of all required control joints.

B. Non-Metallic Expansion Joint Strips: Pre-molded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, capable of compression up to 35%, of width and thickness indicated.

C. Premolded Control Joint Strips: Material as indicated below designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Polyvinyl chloride complying with ASTM D 2287, General Purpose Grade, Designation PVC-63506.

D. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.6 MASONRY CLEANERS

A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.

2.7 MORTAR AND GROUT MIXES

A. General: Do not add admixtures including air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Mixing: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.

1. For Exterior Brick, use Type N mortar, equal to Flamingo, Blue Circle or Lehigh.

2. For Other Masonry Units use Type S mortar without coloring pigment.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.

B. Do not wet concrete masonry units.

C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.

D. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

E. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.

F. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.

G. Cut masonry units using motor-given saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.

1. Use wet cutting saws to cut concrete masonry units.

3.2 LAYING MASONRY WALLS

A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.

B. Coursing and Bonding:

1. **All CMU shall MATCH EXISTING.**

C. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.

B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

C. Maintain joint width shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.

D. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.

E. Tool all exposed joints, except where otherwise indicated, slightly concave using a jointer larger than joint thickness, unless otherwise indicated.

F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.4 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

A. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.

B. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.

C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as shown below:

1. At juncture of interior partitions and exterior walls, rake and caulk vertical joint.

2. Provide metal ties as shown below.

3. Provide individual metal ties at not more than 16" o.c. vertically.

4. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

D. Intersecting Load-bearing Walls: If carried up separately, block or tooth vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1-1/2" x 1/4" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar-filled cores.

E. Non-bearing Interior Partitions: Build full height of story to underside of roof structure above, unless otherwise shown.

3.5 CAVITY WALLS

A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.

B. Tie exterior wythe to new back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.

C. Provide weep holes (Open Head Joints) in exterior wythe of cavity wall located as directed on the drawings, spaced 32" o.c., unless otherwise indicated.

3.6 CAVITY WALL INSULATION

A. On units of plastic insulation, install small pads of adhesive spaced approximately 1'-0" o.c. both ways on inside face. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill all cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 HORIZONTAL JOINT REINFORCEMENT

A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

D. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.

1. In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

3.9 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide formed-in-place masonry lintels. Temporarily support formed-in-place lintels.

C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.10 FLASHING OF MASONRY WORK

A. General: Provide concealed flashing in masonry work at, or above shelf angles, lintels, ledges and other obstructions to the down- ward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.

B. Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan.

C. Interlock end joints of deformed metal flashings by over-lapping deformations not less than 1-1/2" and seal lap with elastic sealant.

D. Install flashing to comply with manufacturer's instructions.

E. Provide weep holes (open head joints) in the head joints of the first course of masonry immediately above concealed flashings. Space weep holes 32" o.c., unless otherwise indicated.

3.11 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point- up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.

C. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.

4. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clean water.

5. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 10 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner indicated below.

   a. Detergent

6. Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.

END OF SECTION

SECTION 05500 - MISCELLANEOUS STEEL AND METAL FABRICATIONS

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 work of this section.

1.2 DESCRIPTION OF WORK

A. Definition: Metal fabrications include items made from iron and steel shapes, plates bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.

B. Extent of metal fabrications is indicated on drawings and schedules.

C. Types of work in this section include metal fabrications for:

1. Rough hardware.
2. Nosing.
3. Loose bearing and leveling plates.
4. Loose steel lintels.
5. Miscellaneous framing and supports.
6. Miscellaneous steel trim.
7. Shelf angles.
8. Steel railings.

1.3 QUALITY ASSURANCE

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings: Submit shop drawings for fabrication and erection of metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.

1. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.

C. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. FERROUS METALS

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Structural, Shapes and Bars: ASTM A 36, wide flange, ASTM A572, fyz50ks.
3. Steel Tubing: Hot-rolled, ASTM A 500. FY=46KSI

4. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
5. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
6. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
7. Gray Iron Castings: ASTM A 48, Class 30.
8. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
9. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
10. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
11. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non- staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. FASTENERS

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
3. Lag Bolts: Square head type, FS FF-B-561.
4. Machine Screws: Cadmium plated steel, FS FF-S-92.
5. Wood Screws: Flat head carbon steel, FS FF-S-111.
6. Plain Washers: Round, carbon steel, FS FF-W-92.
7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
9. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

C. PAINT:

1. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.

D. CONCRETE FILL:

1. Concrete Materials and Properties: Comply with requirements of Division-3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 3000 psi, and W/C ratio of 0.58 maximum, unless higher strengths indicated.
2. Non-Slip Aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing; unaffected by freezing, moisture or cleaning materials.

2.2 FABRICATION - GENERAL

A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.

E. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

F. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

G. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

H. Shop Painting:

1. Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.

a. Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.

I. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast cleaning".

2. Interior (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

2.3 ROUGH HARDWARE

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division-6 sections.

B. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.4 LOOSE STEEL LINTELS

A. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown and scheduled. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise indicated. All steel lintels shall be hot-dipped galvanized steel.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars of welded

construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

1. Except as otherwise indicated, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

2.6 FABRICATION - STEEL RAILINGS AND HANDRAILS

A. Structural Performances: Provide assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.

1. Handrails and Toprails: Capable of withstanding the following loads applied as indicated when tested per ASTM E 935.

2. Concentrated Load: of 200lb applied at any point and any direction.

3. Uniform load of 50 lb per linear ft. applied in any direction.

4. Concentrated and uniform loads above need not be assumed to act concurrently.

5. Guards: Intermediate rails, balusters and panel fillers capable of withstanding a uniform load of 25 lb per sq. ft. of gross area of guard, including any open areas, of which they are a part.

B. Fabricate steel railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of steel tubing of shapes, sizes and wall thickness indicated, but not less than that required to support design loading.

C. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

1. At tee and cross intersections provide coped joints.

2. At bends interconnect tubing by means of prefabricated elbow fittings or flush radius bends, as applicable, or radiuses indicated.

3. At elbow bends provide mitered joints.

4. Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's option.

D. Form simple and compound curves by bending tubing in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.

E. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.

F. Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.

G. Toe Boards: Where indicated, provide toeboards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use a 4" high x 1/8" plate welded to, and centered between, each railing post.

H. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

1. For railing posts sets in concrete provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less than 1/2" greater than the outside dimensions of tubing. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve.

I. Stair Railings and Handrails: Comply with applicable requirements specified elsewhere in this section for steel railings and handrails, and as follows:

1. Railings may be bent at corners, rail returns and wall returns, instead of using prefabricated fittings.
2. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION - GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.

1. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

C. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

D. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

1. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

3.3 INSTALLATION - STEEL RAILINGS AND HANDRAILS

A. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each

direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.

2. Leave anchorage joint exposed; wipe off excess grout and level 1/8" build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.

B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
3. For hollow masonry anchorage, use toggle bolts having square heads.
4. For stud partitions use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.

C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6" of posts.

D. Cast Treads and Thresholds: Install cast treads and thresholds with anchorage system indicated to comply with manufacturer's recommendations. Seal units exposed to exterior mastic to provide a watertight installation.

3.4 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

B. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

C. For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 06100 - ROUGH CARPENTRY

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 work of this section.

B. Work Included: All wood, nails, bolts, screws, framing anchors and other rough hardware, and all other items needed for rough and finished carpentry in this work but not specifically described in other sections of these specifications.

C. Quality Assurance: In addition to complying with all pertinent codes and regulations, all materials of this section shall comply with pertinent provisions of:

1. Southern Pine Southern Pine Inspection Bureau Plywood 'Softwood Plywood - Construction and Industrial" (Amended June l969), Product Standard PD 1-66 of U.S. Department of Commerce, Bureau of Standards, and A.P.A.
2. Rough Hardware "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings of the American Institute of Steel Construction"
3. Building PaperFederal Specification UU-B-790a, dated February 5, 1968
4. Wood Preservative Standard P-5 of the American Wood Preservers Institute
5. Other Similar and pertinent reference standards for the products needed.

D. Conflicting Requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these specifications, the provisions of the more stringent shall govern.

E. Qualifications of Workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

F. Rejection: In the acceptance or rejection of rough carpentry, no allowance will be made for lack of skill on the part of workmen.

1.2 PRODUCT HANDLING

A. Protection: Store all materials in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather.

1. Use all means necessary to protect lumber materials before, during and after delivery to the job site, and to protect the installed work and materials of all other trades.
2. Deliver the materials to the job site and store all in a safe area, out of the way of traffic, and shored up off the ground surface.
3. Protect all metal products with adequate weather-proof outer wrappings.
4. Use extreme care in the off-loading of lumber to prevent damage, splitting and breaking of materials.
5. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately stored to prevent its inadvertent use.
6. Do not allow installation of damaged or otherwise non-complying material.
7. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 – MATERIALS

2.1 MATERIALS - GENERAL

A. Grade Stamps:

B. Framing Lumber: Identify all framing lumber by proper grade stamp.

C. Plywood: Identify all plywood as to species, grade and glue type by the stamp of the American Plywood Association.

D. Other: Identify all other materials of this section by the appropriate stamp of the agency listed in the reference standards, or by such other means as are approved in advance by the Architect.

E. Moisture Content: Moisture content of any material for framing not to exceed 19% for boards 8" in width or less. Boards exceeding 8" in width not to exceed 15% at time of installation. All material used for finish and trim work to be kiln dried material with moisture content not to exceed that allowed by FHA for intended use.

2.2 MATERIALS - WOOD

A. All materials of this Section, unless specifically otherwise approved in advance by the Architect, shall meet or exceed the following:

1. Plates, Grounds or furring
   a. Pressure treated #2 KD Southern Yellow Pine in contact w/concrete, masonry or plaster
2. Plywood Roof Decking
   a. 5/8" – 4' x 8' CDX Grade with exterior glue, install with plyclips.

      or

   b. Pressure Treated 5/8" – 4' x 8' CDX Grade with exterior glue, install with plyclips
3. All Framing Members
   a. Lodge Pole Spruce #2 KD
4. Wood Preservative
   a. Ammonical copper arsenite or 5% solution of pentachlorophenol

2.3 MATERIALS – MISCELLANEOUS

A. All materials of this Section, unless specifically otherwise approved in advance by the Architect, shall meet or exceed the following:

1. Steel Hardware
   a. ASTM A-7 or A-36 (Use galvanized at exterior locations)
2. Machine Bolts
   a. ASTM A-307
3. Lag Bolts
   a. Federal Specifications FF-B-561
4. Nails
   a. Common (Except as noted) Federal Specifications FF-N-1-1 (Use galvanized at exterior locations)
5. Flashing
   a. Nervastral Seal Prof HD-20 except where metal is indicated. Nervastral Seal Prof HD shall be installed on all sills and heads ½" inward from outside face of wall and extended 6" on each side of opening brick veneer construction. The sheeting shall not be allowed

to hang free prior to completion of brick work but shall be secured to the siding with nails and discs or furring strips.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Stockpiling: Stockpile all materials sufficiently in advance of need to ensure their availability in a timely manner for this work.

B. Delivery Schedules: Make as many trips to the job site as are necessary to deliver all materials of this section is a timely manner to ensure orderly progress of the total work.

C. Compliance: Do not permit materials not complying with the provisions of this section of these specifications to be brought onto or to be stored at the job site; immediately remove from the job site all non-complying materials and replace them with materials meeting the requirements of this section.

D. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

1. Verify that rough carpentry may be performed in strict accordance with the original design and all pertinent codes and regulations.

E. Discrepancies: In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

F. Workmanship: All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the drawings and with all pertinent codes and regulations.

G. Selection of Lumber Pieces: Carefully select all members; select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections.

1. Cut out and discard all defects which render a piece unable to serve its intended functions; lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

H. Shimming: Do not shim sills, joists, short studs, trimmers, headers, lintels, or other framing components.

I. Treated Lumber: Use only treated lumber for all wood blocks and nailing grounds, etc. (other than foundation grade redwood) in, or in contact with, concrete.

J. Treatment: Treat all wood less than two feet above finished grade by spraying with the preservative specified in this section of these specifications, to a minimum distance of six inches from the ends, or otherwise treat as approved in advance by the Architect. Perform all treatment in strict accordance with published recommendations of the manufacturer of the treatment preservative.

K. General Framing: In addition to all framing operations normal to the fabrication and erection indicated on the drawings, install all backing required for the work of other trades. Set all horizontal or sloped members with crown up. Do not notch, bore, or cut members for pipes ducts conduits, or other reasons except as shown on the drawings or as specifically approved in advance by the Architect.

L. Bearing: Make all bearings full unless otherwise indicated on the drawings. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support; where framing members slope, cut or notch the ends as required to give uniform bearing surface.

M. Blocking: Install all blocking required to support all items of finish and to cut off all concealed draft openings, both vertical and horizontal, between ceiling and floor areas.

1. All other locations where openings could afford passage for rodents or flames.

2. Fire-block in the following specific locations:

    a. In all stud walls at ceiling and floor levels.

    b. In all stud walls, including furred spaces, so that the maximum dimension of each concealed space is not more than eight feet.

    c. All other locations where openings could afford passage for rodents or flames.

N. Stud Walls and Partitions: Make all studs single length, unspliced, and platform framed.

O. Corners and intersections: Unless otherwise indicated on the drawings, frame all corners and intersections with three or more studs and all required bearing for wall finish.

P. Alignment: On all framing members to receive a finished wall or ceiling, align the finish subsurface to vary not more than 1/8 inch from the plane of surfaces of adjacent framing and furring members.

Q. Nailing: Use only common wire nails or spikes except where otherwise specifically noted in the drawings.

1. Provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike provided, however, that 16 d nails may be used to connect two pieces of the two inch (nominal) thickness.

2. Do all nailing without splitting wood, preboring as required; replace all split members.

R. Bolting: Drill holes 1/16 inch larger in diameter than the bolts being used; drill straight and true from one side only. Bolt threads must not bear on wood; use washers under head and nut where both bear on wood; use washers under all nuts.

S. Screws: For lag screws and wood screws, prebore holes same diameter as root of thread; enlarge holes to shank diameter for length of shank.

1. Screw all lag screws and wood screws. Do NOT Drive screws.

T. Installation of Building Paper: Install the specified building paper over all exterior framing members where indicated to be installed, lapping all joints to prevent penetration of water into the stud spaces, and securely fastening the paper in place in accordance with the manufacturer’s published recommendations.

U. Cleaning Up: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends, and debris.

END OF SECTION

SECTION 06192 - METAL PLATE CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Roof Trusses.
2. Truss accessories.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 5 Section "Metal Fabrications" for rough hardware anchoring trusses to concrete or masonry structures.
2. Division 6 Section "Rough Carpentry" for roof and floor sheathing of structural-use panels and dimension lumber for supplementary framing and permanent bracing.

1.3 DEFINITIONS

A. Metal-plate-connected wood trusses include planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer, fabricate, and erect metal-plate-connected wood trusses to withstand design loads within limits and under conditions required.

1. Design Loads: As indicated.
2. The truss manufacture shall design the trusses for the sprinkler piping load and to provide adequate support at the connection points.

B. Engineering Responsibility: Engage a fabricator who uses a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for metal-plate-connected wood trusses.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

1. Product Data for lumber, metal-plate connectors, metal framing connectors, bolts, and fasteners.

B. Shop Drawings detailing location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber to be used; splice details; type, size, material, finish, design values, and orientation and location of metal connector plates; and bearing details.

1. To the extent truss design considerations are indicated as fabricator's responsibility, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Include truss Shop Drawings signed and sealed by the qualified professional engineer responsible for their preparation.

C. Product certificates signed by officer of truss fabricating firm certifying that metal-plate-connected wood trusses supplied for Project comply with specified requirements and Shop Drawings.

D. 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 owners, and other information specified.

E. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.

F. 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 American Lumber Standards Committee (ALSC) Board of Review.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed wood truss installation similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Fabricator's Qualifications: Engage a firm that complies with the following requirements for quality control and is experienced in fabricating metal-plate-connected wood trusses similar to those indicated for this Project and with a record of successful in-service performance:

1. Fabricator participates in a recognized quality-assurance program that involves inspection by SPIB; Timber Products Inspection, Inc.; Truss Plate Institute (TPI); or other independent inspecting and testing agency acceptable to Architect and authorities having jurisdiction.

C. Comply with applicable requirements and recommendations of the following publications:

1. ANSI/TP1 1, "National Design Standard for Metal-Plate-Connected Wood Truss Construction."

2. TPI HIB "Commentary and Recommendations for Handling Installing & Bracing Metal Plate Connected Wood Trusses."

3. TPI DSB "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses."

D. Metal-Plate Connector Manufacturer's Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in ANSI/TPI 1.

E. Single-Source Responsibility for Connector Plates: Provide metal connector plates from one source and by a single manufacturer.

F. Wood Structural Design Standard: Comply with applicable requirements of AFPA's "National Design Specification for Wood Construction" and its "Supplement."

G. Single-Source Engineering Responsibility: Provide trusses engineered by metal-plate connector manufacturer to support superimposed dead and live loads indicated, with design approved and certified by a qualified professional engineer.

H. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated that have resulted in installing metal-plate-connected wood trusses similar to those indicated for this Project and with a record of successful in-service performance.

1. **NOTE: At the Completion of Truss Erection, the Contractor shall provide a Truss Inspection of the installed trusses and permanent bracing by an Engineer Registered in the State of Alabama. The Engineer's Report shall certify the trusses are Correctly Installed, using specified wood grade and configured to meet the design of the supplier. His signed Seal shall be affixed to the report and submitted to the Architect and Engineer Of Record.**

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses with care and comply with manufacturer's written instructions and TPI recommendations to avoid damage and lateral bending.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.8 SEQUENCING AND SCHEDULING

A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying progress of other trades whose work must follow erection of trusses.

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. Metal Connector Plates:
    a. Alpine Engineered Products, Inc.
    b. Computrus, Inc.
    c. Mitek Industries, Inc.
    d. Robbins Manufacturing Company.
    e. Tee-Lok Corporation.
    f. Truswal Systems Corporation.
2. Metal Framing Anchors:
    a. Cleveland Steel Specialty Co.
    b. Harlen Metal Products, Inc.
    c. Silver Metal Products, Inc.
    d. Simpson Strong-Tie Company, Inc.
    e. Southeastern Metals Manufacturing Co., Inc.
    f. United Steel Products Co.

2.2 DIMENSION LUMBER

A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:

1. SPIB - Southern Pine Inspection Bureau.

C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

D. Provide dressed lumber, S4S, manufactured to actual sizes required by DOC PS 20 for moisture content specified, to comply with requirements indicated below:

1. Provide dry lumber with 19 percent maximum moisture content at time of dressing.

E. Grade and Species: Provide visually graded dimension lumber for truss chord and web members, of the following grade and species:

1. Grade for Chord Members: No. 2.
2. Grade for Web Members: No. 2.
3. Species: Southern pine graded per SPIB rules.

2.3 METAL CONNECTOR PLATES

A. General: Fabricate connector plates from metal complying with requirements indicated below.

B. Hot-Dip Galvanized Steel Sheet: Structural-quality steel sheet, zinc coated by hot-dip process

complying with ASTM A 653, G60 coating designation; Grade 33 and not less than 0.0359 inch thick.

C. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591, structural-(physical) quality steel sheet, zinc coated by electrodeposition; 33,000-psi minimum yield strength, coating class C, and not less than 0.0474 inch thick.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified below for material and manufacture.

1. Where truss members are exposed to weather or to high relative humidities, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of stainless steel, Type 304 or 316.

B. Nails, Wire, Brads and Staples: FS FF-N-105.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts and Screws: 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.

2.5 METAL FRAMING ANCHORS

A. General: Provide metal framing anchors of structural capacity, type, size, metal, and finish indicated that comply with requirements specified, including the following:

B. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for this Project.

C. Allowable Design Loads: Provide products with allowable design loads, 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.

D. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653,

G60 coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.

E. Stainless-Steel Sheet: ASTM A 666, Type 304 or 316, chromium nickel steel sheet; 33,000-psi minimum yield strength.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.

2.7 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required to withstand design loadings for types of joint designs indicated.

C. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances of ANSI/TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances of ANSI/TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously into both sides of wood members by air or hydraulic press.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install wood trusses until supporting construction is in place and is braced and secured.

B. Before installing, splice trusses delivered to Project site in more than one piece.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to recommendations of TPI and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space, adjust, and align trusses in location before permanently fastening and as follows:

1. Truss Spacing: As indicated.

G. Anchor trusses securely at all bearing points using metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

J. Install wood trusses within installation tolerances of ANSI/TPI 1.

K. Do not cut or remove truss members.

L. Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.

1. Do not alter trusses in the field.

3.2 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Definition: Finish carpentry includes carpentry work which is exposed to view, is non-structural, and which is not specified as part of other sections. Types of finish carpentry work in this section include:

1. Interior running and standing trim.
2. Plywood Ceilings

1.3 SUBMITTALS

A. Product Data: Indicate Product description including product information and compliance with specified performance requirements.

B. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with section 01600. Indicate plans, sections, dimensions, component sizes, edge details, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for receptacles and other items installed in the specified product.

C. Samples: Submit samples in accordance with Section 01300. Submit minimum 2’ x 2’ samples.

1. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of pattern variation. Approved samples will be retained as standards for work.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Do not deliver finish carpentry materials, until operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

PART 2 - PRODUCTS

2.1 MATERIALS - INTERIOR

A. Standing and Running Trim for Painted Finish

1. Moldings, Bases, Casings, Crowns and Miscellaneous Trim: “B” and better fir or poplar, sizes and shapes as indicated on plans.

B. Plywood Ceilings

1. *Exposed* Plywood Panels shall be 5/8” B/C Sanded Grade, 4 x 8 plywood, painted.

a. All seams/joints shall be covered with ¾” wide batten strips, painted.

2.2 FABRICATION

A. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.

B. Moisture Content of Softwood Lumber: Provide kiln-dried (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

C. Fasteners and Anchorages: Provide nails, screws and other anchoring devices of the proper type, size, material and finish for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications.

1. Where finish carpentry is exposed on exterior or in areas of high relative humidity, provide fasteners and anchorages with a hot-dipped zinc coating (ASTM A 153).

D. Inspect each piece of lumber and plywood or each unit of finish carpentry after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.

B. Back-prime lumber for finish exposed on the exterior or to moisture and high relative humidity on the interior. Comply with requirements of section on painting within Division 9 for primers and their application.

3.2 INSTALLATION

A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes or patterns.

B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8” in 8’-0” for plumb and level countertops; and with 1/16” maximum offset in flush adjoining and 1/8” maximum offsets in revealed adjoining surfaces.

C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end-to-end joints.

E. Anchor finish carpentry work to anchorage devices 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 a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with finished surface, and matching final finish where transparent is indicated.

3.3 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION

A. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

B. Clean finish carpentry work on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

C. Refer to Division 9 for final finishing of installed finish carpentry work.

D. Protection: Installer of finish carpentry work shall advise Contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END OF SECTION

SECTION 07115 - BITUMINOUS DAMPPROOFING

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 work of this section.

1.2 SUMMARY

A. This Section includes cold-applied, emulsified-asphalt dampproofing applied to the following surfaces:

1. Exterior face of inner wythe of exterior masonry cavity walls and concrete walls above top of foundation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for method of application, primer, number of coats, coverage or thickness, and protection course.

B. Material Certificates: For each product, signed by manufacturers.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain primary dampproofing materials and primers through one source from a single manufacturer. Provide secondary materials recommended by manufacturer of primary materials.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit asphalt dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cold-Applied, Emulsified-Asphalt Dampproofing:
2. Euclid Chemical Company (The)
3. Gardner Asphalt Corporation
4. Henry Corporation
5. Koppers Industries, Inc.
6. Malarkey Roofing Company
7. Meadows, W. R., Inc.
8. Sonneborn, Div. Of ChemRex, Inc.
9. Tamms Industries

2.2 BITUMINOUS DAMPPROOFING

A. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class I.

2.3 MISCELLANEOUS MATERIALS

A. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class I, except diluted with water as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Applicator present, for compliance with requirements for surface smoothness and other conditions affecting performance of work.

1. Begin dampproofing application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection of Other Work: Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

3.3 APPLICATION, GENERAL

A. Comply with manufacturers written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

B. Apply additional coats if recommended by manufacturer or required to achieve coverage's indicated.

C. Allow each coat of dampproofing to cure 24 hours before applying subsequent Coats.

D. Apply dampproofing to top of footings and grade beams where applicable, whether indicated or not.

1. Apply from finished-grade line to top of footing.

2. Extend 12 inches (300 mm) onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.

3. Install flashings and corner protection stripping at internal and external corners, changes in plan, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch (200 mm) wide strip of asphalt-coated glass fabric in aheavy coat of dampproofing. Dampproofing coat required for embedding fabricis in addition to other coats required.

E. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.

1. Lap dampproofing at least ¼ inch (6 mm) onto flashing, masonry reinforcement, veneer ties, and other items that penetrate inner wythe.

2. Extend dampproofing over outer face of structural members and concrete slabs that interrupt inner wythe, and lap dampproofing at least ¼ inch (6 mm) onto shelf angles supporting veneer.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat at not less than 1 gal./100 sq. ft. (0.4 L/sq.m).

3.5 CLEANING

A. Remove dampproofing materials from surfaces not intended to receive dampproofing.

END OF SECTION

SECTION 07200 - INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of insulation work is shown on drawings and indicated by provisions of this section.

B. Applications of insulation specified in this section include the following:

1. Blanket type building above new ceiling or blown insulation in attic area - Contractors Option.
2. Cavity Wall Insulation.
3. Foam Insulation at CMU Cells

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications and installation instructions for each type of insulation and vapor barrier material required.

1.4 PRODUCT HANDLING

A. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS

2.1 BATT INSULATION

A. MANUFACTURERS:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
   a. Certain-Teed Products Corp.; Valley Forge, PA
   b. Manville Bldg. Materials Corp.; Denver, CO.
   c. Owens-Corning Fiberglass Corp.; Toledo, OH.
2. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS:

1. Mineral/Glass Fiber Blanket/Batt Insulation (M/GFB-Ins): Inorganic (nonasbestos) fibers formed into resilient flexible blankets or semi-rigid batts; FS HH-1-521. Manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated.
   a. Above Ceilings: Provide unfaced batts at exposed wood framed roof areas between the trusses at the bottom cord or joists that will receive interior coverings at the bottom of the system (ie: sheetrock, plywood, concrete, etc.).
      a. Thickness: R-Factor: 30 (minimum)
      b. Provide and install Insulation Baffles equal to Owens Corning Raft-R-Mate Attic Rafter Vents with Air Stop/Insulation Block. Extruded Polystyrene; Air Channel Depth, 1.5”; Net Free Air Flow, 22.3 sq.in.; Dimension to fit between rafters. Install per manufacturer’s instructions.

b. Above Ceilings Contractor Option: Provide Granulated Loose fill insulation conforming to Federal Spec. Hh-1-1030, Type I, Class B, in attic area above the air barrier. Labeling shall include the data above as well as the recommended installation density. Provide insulation baffles. This option MUST include insulation baffles as specified below.

a. Thickness: R-Factor: 30 (minimum)

b. Provide and install Insulation Baffles equal to Owens Corning Raft-R-Mate Attic Rafter Vents with Air Stop/Insulation Block. Extruded Polystyrene; Air Channel Depth, 1.5”; Net Free Air Flow, 22.3 sq.in.; Dimension to fit between rafters. Install per manufacturer’s instructions.

2.2 CAVITY WALL INSULATION

A. MANUFACTURERS:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.

a. Styrofoam SM/SB; Dow Chemical USA.

b. Foamular 250; UC Industries.

c. Certifoam, Minnesota Diversified Products, Inc.

2. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS:

1. Extruded Polystyrene Board Insulation: Rigid cellular polystyrene thermal insulation with closed cells and integral high density skin, formed by the exposion of polystyrene base resin in an extrusion process to comply with ASTM C 578, Type IV; 5-year aged

2. All Cavity Walls: Provide rigid thermal insulation at the cavity space.

a. R-value of 5.0 Btu/ (hr x sf x degree F) at 75 degree F in manufacturer's standard lengths and widths

b. 1" thick, unless otherwise indicated.

3. Adhesive:

a. Type recommended by insulation board manufacturer for application indicated.

2.3 CMU FILLED CELL WALL INSULATION

A. MANUFACTURERS:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.

a. Core-Fill 500, as manufactured by Tailored Chemical Products, Inc., Hickory, NC. Phone: (800) 627-1687: www.core-fill500.com.

b. R501, as manufactured by PolyMaster, Inc.", Knoxville, TN. Phone: (800) 580-3626.

c. Core Foam Masonry Foam Insulaton by cfiFOAM, Inc., Knoxville, TN. Phone: (800) 656-3626.

2. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS:

1. Insulation: Aminoplast foam for injection application.

a. Thermal Resistivity: **R/inch equal to R-4.4/inch** @ 75 degrees F mean when tested per either ASTM C-177 or ASTM C518.

b. Water Vapor Transmission: Average ≤15 perms when tested per ASTM E 96/E96M.

c. Potential Heat: ≤7700 Btu/lb. when tested per NFPA 259.

d. Cured Density: ≤1.0 lb/ft3 (dry) when tested per ASTM D 1622.

e. Surface Burning Characteristics: Class A - Flame Spread ≤25, Smoke Developed ≤450 per ASTM E 84.

C. INSTALLATION:

1. Fill **masonry cells** with foam insulation from exterior face of building.

2. Foam Insulation at exterior concrete block wall **cells**:

a. Fill **cells** of concrete masonry with amino-plast foam insulation. Holes for filling cells of masonry shall be drilled at horizontal masonry joint on the exterior side of exposed masonry walls and re-grouted.

b. Installed insulation value: **R-10**.

3. Reference Standards:

a. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2004.

b. ASTM C518 - 01 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2001.

c. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2004a.

d. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.

e. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2006.

f. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.

g. ASTM E 96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

h. NFPA 259 - Standard Test Method for Potential Heat of Building Materials

4. **NOTE: Both Cavity Wall Insulation and CMU Filled Cell Wall Insulation is required at all exterior CMU walls.**

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Installer must examine substrates and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

B. Clean substrates of substances harmful to insulations or vapor barriers, including removal of projections which might puncture vapor barriers.

C. Close off openings in cavities to receive poured-in-place and insulation, sufficiently to prevent escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.

3.2 INSTALLATION

A. General: Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

3.3 CAVITY WALL INSULATION

A. On units of plastic insulation, install small pads of adhesive spaced approximately 1'-0" o.c. both ways on inside face. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill all cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.4 PROTECTION

A. General: Protect installed insulation and vapor barriers from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure. Installer shall advise Contractor of exposure hazards, including possible sources of deterioration and fire hazards.

END OF SECTION

SECTION 07310

ARCHITECTURAL SHINGLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. The work under this section consists of all composition asphalt shingle roofing, underlayment, ridge vent system, sheet metal, roof drainage accessories and all related items necessary to complete the roofing system work indicated on the drawings and herein specified including but not limited to the following:

1. Underlayment.
2. Dimensional Fiberglass Asphalt Shingle Roofing.
3. Ridge Vent System.
4. Roof Vents.
5. Sheet Metal items furnished and installed in accordance with Section 07600, Flashing and Sheetmetal.

1.3 QUALITY ASSURANCE

A. The Contractor shall engage the services of a Professional Roof Consultant. The Consultant must hold a minimum title of Registered Roof Observer (RRO) through the International Institute of Building Enclosure Consultants (IIBEC) and provide evidence of adequate insurance as required below. The Consultant should perform three (3) inspections during the installation of each new roof system type (1 – Start up inspection; 2 – Interim inspection; 3 – Final inspection). The Consultant must document all site visits with photographs and written reports. All reports shall be forwarded to the Architect with documentation of the roofing progress and any deficiencies noted during the inspections. ***(Note: Although the contractor will be paying the roof consultant from their proceeds, the roof consultant will be considered an agent of the owner and architect throughout the project and will perform the required inspections on behalf of the owner and architect. The above specification shall be applied to individual facilities when multiple site locations are included in the project.)***

1. Roof Consultant Insurance Requirements:
   a. Gen. Liability - $1,000,000 each occurrence - $2,000,000 General Aggregate / Auto. Liability - $1,000,000 / Umbrella Liability. - $1,000,000 / Workers Compensation - $1,000,000 per statute / Professional Liability - $1,000,000
2. Approved Roof Consulting Firm:
   a. Roof Asset Management, Inc.
      David Lee, RRO, CIT, FAA-107
      Millbrook, AL / (334) 590-7999 / dlee@roof-asset.com
   b. Professional Roof Observers, LLC.
      1200 Sumac Road
      Pulaski, TN 38478
      Kevin Turner / (931) 703-6018 / kturner@professionalroofobservers.net.

c. Substitutions: Roof consulting firms must be pre-approved by the Architect. Requests for a substituting firm must be submitted “In writing” 10 (Ten) days prior to the bid opening.

B. Manufacturer Qualifications: Company specializing in Asphalt Roofing Products with fifteen (15) years minimum experience. Provide primary roofing material products from a single source including composition asphalt shingles, preformed ridge & hip cap shingles, starter strip and underlayments all produced by a single manufacturer. Provide secondary products only as recommended by manufacturer of primary products for use with roofing system specified. Being listed as pre-qualified manufacturer does not release manufacturer from providing complete, current, and acceptable test data for each performance, thermal, and wind load requirement specified.

C. Installer’s Qualifications: Installer / sub-contractor must be currently in the primary business of roofing with not less than (5) five consecutive years of recorded successful experience with roofing systems comparable to that of this project under the same company name. Installer shall be licensed or otherwise authorized by state and local authorities to install all products specified in this section. **Installer shall be certified by the roofing material manufacturer as trained and approved for installation of such roofing materials indicated for this project**. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual. Joint ventures shall not be allowed.

D. A full-time field supervisor or foreman with minimum of (5) years of experience in a roofing supervisory role, having performed on projects of comparable scope and type shall be required to be on site at all times during roofing work. Any roofing installed during times when the supervisor/foreman is not on site is subject to rejection.

E. The Roofing Contractor shall be responsible for weather-tightness of the entire roofing system.

F. The Roofing Contractor shall inspect and accept condition of the roof deck and components of mechanical penetrations prior to installation of the roofing system.

1.4 ASSEMBLY REFERENCE STANDARDS

A. Underwriters Laboratories Fire Test of Roof Deck Construction Standard 1256.

B. Underwriters Laboratories Test for Wind Uplift resistance of Roof Deck

C. Assemblies Standard 580.

D. ASTM D 3161 Class F Wind Resistance

E. ASTM D 7158, Class H Wind Resistance.

F. ASTM D 3462 – Standard Specification for Asphalt Shingle Made from Glass Felt and Surfaced with Mineral Granules.

G. ASTM D 3018 – Standard Specification for Class A Shingles Surfaced with Mineral Granules.

H. ASTM E108 Fire Resistance: Class A

I. UL 790 Fire Resistance: Class A

J. Roof Deck Manufacturers Design Manual.

K. NRCA – “The NCRA Roofing and Waterproofing Manual”

L. Impact Resistance: Roof coverings installed on low-slope roofs (roof slope <2:12) shall resist impact damage based on the results of tests conducted in accordance with ASTM D 3746

1.5 ROOFING PERFORMANCE REQUIREMENTS

A. The roof deck assembly shall exhibit the following performance characteristics:

1. Wind Uplift Rating - FM 1-135 (or per local codes whichever is greater.)
2. Factory Mutual Classifications - FM Class 1
3. Fastener Withdrawal Strength - 40 lbs. min. (or per local codes whichever is greater.)

B. Composition Asphalt Shingles shall be self-sealing and provided resistant to wind damage as tested up to **130 MPH** winds.

C. Certification of Roofing System: Contractor(s), Roofing Material Manufacturer, and Roofing Material Manufacturer's Field Inspector shall provide a final inspection to verify proper installation and execute the Certification of Roofing System.

1.6 SUBMITTALS

A. Product Data: Submit manufacturer's warranty, technical product data, test reports, maintenance data, installation instructions and recommendations for each type of roofing product required. Include highlighted data substantiating that materials comply with requirements. Include similar color charts of trim and accessories involving color selection.

B. Submit a sample panel to match existing adjacent shingles for approval (If required).

C. Installer's Qualification Data

D. Sample Warranty

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and storage of material: Store and handle roof materials in a manner which will ensure that there is no possibility of significant moisture pick up. Store in a dry, well ventilated, weather tight place. Unless protected from weather or other moisture sources, do not leave unused roofing materials on the roof surface overnight or when roofing work is not in progress. Store rolls of materials and other materials on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck. All material must be protected from the weather by protective tarps. Manufacturer's plastic covers are not acceptable means of protection.

B. Scheduling and coordinating work: Schedule and coordinate roofing and sheet metal installations with the work of other trades where it is integral or contiguous therewith. Materials furnished under this section, which are to be built-in by other trades, shall be delivered to the site in sufficient time to avoid delays to construction progress. Instruct other trades concerning the location and placement of reglets, wood nailers and cleats.

C. Proper surfaces: Surfaces to which roofing, and sheet metal are to be applied shall be even, smooth, sound, thoroughly clean and dry, and free from projection nail heads or other defects that would affect the application. Report in writing any unsatisfactory surfaces to the Architect in advance of roofing work.

D. Dis-similar metals: Where dis-similar metals abut, the juncture shall be executed in a manner that will facilitate drainage and thus minimize the possibility of galvanic action.

E. Accessories: All accessories or other items essential to the completeness of the sheet metal installation shall be provided as required. All such items, unless otherwise indicated on the drawings or specified, shall be of the same kind of materials as the item to which applied, and the gauges shall conform to recognized industry standards of sheet metal practice.

F. Solvent-based materials: Store and dispose of solvent-based materials and materials used with solvent based materials, in accordance with requirements of local authorities having jurisdiction.

G. Extra Material: Furnish to owner

1. Provide 400 square feet (4 square) of extra shingles of each color specified.

1.8 PROJECT CONDITIONS

A. Substrate: Proceed with shingle work only after substrate construction and penetrating work have been completed.

B. Weather Conditions: Proceed with shingle work only when weather conditions are in compliance with manufacturer's recommendations and when substrate is completely dry.

1.9 ROOFING GUARANTEE

A. Contractor's Roofing Guarantee

1. All work included in this section shall be jointly and unconditionally guaranteed by the General Contractor and the Contractor for this section, against leaks from faulty or defective materials and workmanship for a period of Five (5) Years starting on the date of acceptance of the project by the Owner.

2. Contractor shall furnish Contractors 5 Year Roofing Guarantee. This roofing guarantee is included in the front-end documentation of this project manual.

   a. The roofing guarantee shall be executed in three (3) original copies, signed by the appropriate parties, and submitted to the Architect, Owner, and the appropriate County / City Departments if required.

3. Warranty shall include the following: The General Contractor and Roofing Installer shall be responsible for all water damaged materials due to roof leaks for a period of 5 years.

B. Manufacturer's Warranty

1. Manufacturer's roofing warranties which contain language regarding the governing of the warranty by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the Laws of the State of Alabama shall govern all such warranties.

2. The Contractor shall provide to the Roofing manufacturer's fully executed shingle warranty on shingle materials.

   a. Material Warranty Period: Forty (40) years from Date of Substantial Completion. Failures include, but are not limited to, the following:

      i. Manufacturing defects.

      ii. Structural failures including failure of asphalt shingles to self-seal after a reasonable time.

   b. Non-prorated (Labor & Material) Warranty Period: 25 Year Non-Prorated Warranty Period covering material and labor costs for repair or replacement.

   c. Algae Discoloration Warranty Period: Asphalt shingles will not discolor fifteen (15) years from Date of Substantial Completion.

   d. Wind Warranty: Asphalt shingles will resist blow-off or damage caused by wind speeds up to 130 MPH for Fifteen (15) years from Date of Substantial Completion.

3. Insulated Decks and Radiant Barriers

   a. Manufacturer's warranty, including non-prorated period, will remain in force when shingles are applied to roof deck assemblies where foam insulation is prefabricated into the roof deck system, where insulation is installed beneath an acceptable roof deck system, or where radiant barriers are installed, with or without ventilation, directly below the deck.

4. The roofing manufacturer shall be required to provide documentation certifying the roofing system and products specified comply with the performance requirements as set forth in IBC Chapter 15, Section 1504. The documentation shall be attached to the roof warranty at the close out of the project.

C. All roof warranties/guarantees shall be provided to the Owner, by the Contractor at the Final Inspection to obtain the Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship, and function:

1. Owens-Corning “Duration Series”.
2. GAF “Timberline High Definition HDZ Series”.
3. Tamko “Titan XT”
4. CertainTeed “Landmark Series”.

2.2 MATERIALS

A. Glass-Fiber Reinforced Dimensional/Architectural Asphalt Shingles: Conforming to ASTM D 3161, ASTM D 7158, UL2390, ASTM E108, UL 790, UL Certified to meet ASTM D 3462, ASTM D 3018; glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle; four-tab shingle with each tab independently colored by granules no bleed over of granules from previous tab.

1. Color: As selected by Architect after bid date from manufacturer’s standard selection.
2. Shingle System to be complete with manufacturer’s underlayment, starter shingles and hip and ridge shingles.
3. Limitations: Use on roofs with slopes greater than 2:12 pitch. Low slope applications (2:12 to 4:12 pitch) require additional underlayment. Follow manufacturer’s instructions for waterproofing in these areas per applications instructions on shingle package. On slopes greater than 2:12 pitch apply 1 inch diameter spots of asphalt roofing cement (ASTM D 4586 Type II) under the shingle tab corner according to application instructions provided on the shingle package.

B. Underlayment:

1. Ice and Water Shield: Self-adhering waterproofing membrane underlayment: ASTM D 1970; minimum of 60-mil- thick sheet; glass-fiber-reinforced; SBS-modified asphalt; mineral-granule surfaced.
    a. Provide at all valleys, ridges, penetrations, curbs, hips, roof edges, below copings, etc.
2. Synthetic Underlayment/Felt: Polyolefin based scrim reinforced roofing underlayment: ASTM D4869; ASTM D 226; Fire resistance ASTM E 108, UL 790 Fire Resistant. UL classified as a Prepared Roofing Accessory.
    a. Provide at all open field roof areas.

C. Starter Shingles:

1. Starter Shingles: Primary shingle manufacturer’s starter shingle: Starter must extend beyond primary field shingle nail penetration line. (Shall be located at the eaves and rakes or any other location where shingle roof begins. The nails should be positioned as near to the eave’s edge as possible (max 3”) while avoiding sealant.)

D. Hip/ Ridge Shingles:

1. Hip and Ridge Shingles: Primary shingle manufacturer's pre-cut hip and ridge shingles applicable for wind warranty rating required under this Specification Section: ASTM 3018; ASTM 3462; ASTM E108, ASTM 3161

E. Ridge Vent:

1. Rigid Ridge Vent: High-density polypropylene resin or other UV-stabilized plastic ridge vent: External wind deflector baffles; 18 sq. in. of net free area per linear foot; ASTM G155

F. Intake Vents: (If required) - Attic roof vent that is an on-the-rooftop, intake ventilation product that lets fresh air in to balance ridge vents. Low profile to blend in with roof. Must have end caps/plugs for weather protection and finished appearance.

1. IN-VENT by Cor-A-Vent.
2. Smart Vent by DCI attic Intake SV-TAP.
3. Filtered Edge Vent by CertainTeed.
4. Color to be selected by architect from manufacturer standards.
5. Must be strictly installed according to manufacturer requirements.

G. Gravity Vents:

1. High-Capacity Dome Roof Louver Style Gravity Vents; 144 square inches NFVA each; Galvanized Steel construction.
2. Slant Roof Louver Style Gravity Vents; 50 square inches NFVA each; Heavy duty Galvanized construction.
3. Finish: Site Painted with Shingle Color match system paint of shingle manufacturer.

H. Fasteners:

1. Hot dip galvanized, sharp pointed, conventional ring-shank roof nails, 11 to 12 gauge, with minimum of 3/8" diameter flat heads, minimum of 1-1/4" – 1-1/2" length or of sufficient length to penetrate at least 3/4" into / beyond wood decking shall be used as required. Pneumatically driven fasteners, nails, or staples will not be allowed to be used on this project.
2. Dry-in felt shall be fastened with large 1" head plastic cap nails.
3. Fasteners for metal flashing materials shall be heavy galvanized. Exposed fasteners for sheet metal flashings shall be screw-type with weather seal washers. Prefinished to match.

I. Asphalt Roofing Cement:

1. Roof cement shall be asbestos free non-hardening, elastic waterproof type ASTM 4586, Type II; Consistency as required by roofing material manufacturer for application.
2. All other required materials necessary for a complete job as recommended by the roofing manufacturer or as required by good practice.

2.3 MISCELLANEOUS SHEET METAL WORK

A. Work under this section includes all other incidental sheet metal items shown on drawings as accessories, trims, and flashings to the composition asphalt roof shingles that may not be specifically included in other sections of the specifications and/or work.

1. Install metal flashing in accordance with The NRCA Roofing and Waterproofing Manual per NRCA including but not limited to:
   a. Step Flashing
   b. Cricket Flashing

c. Rake and Eave Drip Edge Flashing

d. Apron Flashing

e. Pipe and Post Flashing

f. Lead Vent Pipe Flashing

B. Refer to Section 07600, Flashing and Sheetmetal, for additional information.

C. Miscellaneous Items

1. Install and flash all items furnished and set by others as specified, in accordance with good practice, properly flashed and bonded weathertight into roofing.

PART 3 - EXECUTION

3.1 PRE-ROOFING CONFERENCE

A. A pre-roofing conference is required before any roofing materials are installed. This conference shall be conducted by a representative of the Architect. Required attendees include representatives of the Owner, Department of Construction Management Inspector, General Contractor, Roofing Contractor, Sheet Metal Contractor, Roof Deck Manufacturer (if applicable), Roofing Materials Manufacturer (if warranty is required of this manufacturer) and all installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment. ATTENDANCE OF THE CONTRACTOR'S FOREMAN IS MANDITORY. If equipment of substantial size is to be placed on the roof, the Mechanical Contractor must also attend this meeting. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.

B. The pre-roofing conference is intended to clarify demolition and application requirements for work to be completed before roofing operations can begin. This would include a detailed review of the specifications, roof plans, roof deck information, flashing details, and approved shop drawings, submittal data, and samples. If conflict exists between the specifications and the Manufacturer's requirements, this shall be resolved. If this pre-roofing conference cannot be satisfactorily concluded without further inspection and investigation by any of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should the work proceed without inspection of all roof deck areas and substantial agreement on all points.

C. The following are to be accomplished during the conference:

1. To review all Factory Mutual and Underwriters Laboratories requirements listed in the specifications and resolve any questions or conflicts that may arise.

2. To establish trade-related job schedules, including the installation of roof mounted mechanical equipment.

3. To establish roofing schedule and work methods that will prevent roof damage.

4. Require that all roof penetrations and walls be in place prior to installing the roof.

5. To establish those areas on the job site that will be designated as work and storage areas for roofing operations.

6. To establish weather and working temperature conditions to which all parties must agree.

7. To establish acceptable methods of protecting the finished roof if any trades must travel across or work on or above any areas of the finished roof.

8. Tour representative areas of roofing substrates (decks); inspect and discuss condition of substrate, penetrations and other preparatory work performed by other trades.

9. Review structural loading limitations of deck and inspect deck for proper installation and fastening as required. Inspect deck for required slope etc.

10. Review roofing system requirements (drawings, specifications, and other contract documents). Review required submittals / warranty issues. Verify that the manufacturer's

label contains references to specified ASTM standards.

11. Review and finalize construction schedule related to roofing work and verify availability of materials.
12. Review roof application procedures, technique, details, and roof specifics. Maintain one copy of manufacturer's application instructions on the project site.
13. Review job specific safety requirements, safety barriers, street blocking, haul routes, building access, site contact, facilities, security, etc.

D. The Architect shall prepare a written report indicating actions taken and decisions made at this pre-roofing conference. This report shall be made a part of the project record and copies furnished the General Contractor and the Owner.

3.2 PREPARATION OF SUBSTRATE

A. Clean substrate of any projections and substances detrimental to shingling work.

B. Coordinate installation of shingles with flashing and other adjoining work to ensure proper sequencing.

3.3 INSTALLATION – GENERAL

A. General: Comply with instructions and recommendations of shingle manufacturer in relationship to low slop roof application, except to extent more stringent requirements are indicated.

B. Installer of shingles must examine substrate and conditions under which shingling work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with shingling work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.4 APPLICATION OF UNDERLAYMENT AND ROOFING SHINGLES

A. (Note: For roof replacement projects, the contractor shall remove the existing shingles, underlayment, and associated flashing components down to the existing deck substrate prior to the application of new underlayment and shingles. Contractor is to notify the Architect of any damaged / deteriorated roof decking. If directed by the Architect, the contractor shall replace damaged portions of the decking per the Unit Price on the proposal form.)

B. Underlayment Application:

1. Synthetic Underlayment:
    a. Apply one layer of synthetic underlayment horizontally, free of wrinkles, over entire roof deck surface, lapping succeeding courses 2" minimum in direction to shed water, and lapping ends min. 4" with adjacent end laps staggered 60". Provide 18" each side of hips. Fasten 36" max. o.c. or as necessary to assure stable placement of felt underlayment until the shingles are installed. Fasten with nails (no staples).
    b. Install saturated felt starter courses as per low slope application requirements lapped and cemented as indicated by the manufacturer.
2. Self-Adhered Underlayment:
    a. Install at all Valleys, Ridges, Hips and Eaves, Penetrations, Curbs, Rakes, Changes in Elevation, and Miscellaneous Roof Edges.
    b. Install underlayment centered to the center of the valley. Extend minimum of 18" in each direction from middle of all valleys.
    c. Install upward from the edge of all eaves a total distance of 36".

d. Install on all ridges and hips a minimum of 18” in each direction from middle of ridge / hip line.

e. Install 18” wide strip each side of expansion joint flange.

C. Shingle Application:

1. Install Composition Asphalt Shingles system, including but not limited to shingles, pre-formed ridge, and hip shingles in accordance with manufacturer’s printed instructions and in accordance with The NRCA Roofing and Waterproofing Manual per NRCA.
2. Install all shingles with uniform exposure as specified by the manufacturer.
3. Install manufactured starter strips, pre-formed ridge, and hip shingles in strict accordance with manufacturer’s printed requirements.
   a. Provide starter strip at lowest roof edge and along rake edges.
   b. Shingles shall extend ¾” beyond roof edge flashing.
   c. Fasten ridge shingle with nail of length sufficient to fully penetrate roof decking.
4. Install base and wall cap flashings (where roofing meets masonry walls) in strict accordance with the roofing manufacturer’s printed specifications.
5. Provide closed cut valleys per manufacturer’s printed instructions; initial layer to lap the valley without fasteners in the valley and upper layer to be cut back two inches parallel to valley center.
6. Fasten shingles in locations as indicated by the shingle manufacturer’s printed instruction according to roof slope and wind load requirements with no less than six (6) nails installed in each shingle regardless of manufacturer’s approvals.
7. The application of the shingles will be by hand nailing ONLY. Pneumatic nail guns will NOT be permitted for installation of shingles.
8. “Racking” of the shingles will not be permitted.
9. Staples will NOT be permitted.
10. Lap cap shingles in direction away from prevailing winds.

D. Install vent pipe in strict accordance with the manufacturer’s instruction for application.

E. Properly flash all other penetrations in accordance with the roofing manufacturer’s printed instructions.

F. Upon completion of application all shingles shall be properly nailed, with even /uniform exposure, and straight lines and free of loose, crooked, or buckled shingles. Entire installation shall be watertight and properly bonded to flashing.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

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 work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of each type of flashing and sheet metal work is indicated on drawings and by provisions of this section.

B. Types of work specified in this section include the following:

1. Metal Counter Flashing and Base Flashing.
2. Metal Diverters. Verify location with Architect for all entry doors.
3. Exposed Metal Trim Units
4. Eave Strip/Drip Edge
5. Fascia
6. Soffit
7. Coping
8. Gutters
9. Downspouts
10. Elastic flashing.
11. Elastic roof/wall expansion joint systems.

C. Integral masonry flashings are specified as masonry work in sections of Division 4.

1.3 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

E. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007, with Editorial Revision (2012).

F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007, with Editorial Revision (2012).

G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

A. Product Data; Flashing, Sheet Metal, Accessories: Submit manufacturer's product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

1.5 JOB CONDITIONS

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.

B. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning,

   a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.2 GUTTERS

A. Gutters: Provide flat shapes, no rolled formed stiffeners or ribbed allowed. Form gutters in "continuous" sections not less than 8 feet in length, complete with end pieces, outlet tubes and other special pieces as may be required. Join sections with riveted and soldered or sealed joints. Provide expansion-type slip joint at center of runs.

   1. Furnish gutter supports spaced at 36" on center constructed of same metal as gutters.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.

C. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning,

   a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.3 DOWNSPOUTS

A. Downspouts: Form downspouts in sections approximately 10 feet long **(no corrugated sections)**, complete with elbows and offsets. Join sections with not less than 1-1/2" telescoping joints. Provide fasteners, designed to securely hold downspouts not less than 1" away from walls; locate fasteners at top and bottom and equally spaced at approximately 5 feet on center in between.

B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.

C. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss

   finish is required to minimize the appearance of oil canning,

   a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.4 METAL SOFFIT SYSTEM

A. Manufacturer: The following manufacturers' products have been used to establish minimum standard for materials, workmanship and function:

   1. PAC-CLAD (Basis of Design); www.pac-clad.com: 1005 Tonne Road, Elk Grove Village, IL 60007; Ph: 800-PAC-CLAD

   2. MBCI Manufacturing; www.mbci.com; 2280 Monier Avenue, Lithia Springs, Georgia, 30122; Phone: 844.2506 or 770.729.4772.

3. Morin / A Kingspan Group Company; www.kingspan.com/us/en-us/product-groups/metal-roof-wall-systems; 1975 Eidson Drive, Florida, 32724; Phone: 860.584.0900 or 800.640.9501

B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

C. MATERIALS - FORMED METAL SOFFIT PANELS

1. **PAC-CLAD Flush Profile, Concealed Fastener Metal Soffit Panels**: Structural metal panels consisting of formed metal sheet with vertical panel edges and flat pan, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.

a. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A755/A755M.

i. Nominal Thickness: 24 gauge (Standard) coated thickness, with smooth surface.

ii. Panel Width: 12 inches.

iii. Panel Thickness: 1 inch.

iv. Flush Narrow (Vented) Panels as indicated on drawings.

v. Flush Solid (Non-Vented) Panels as indicated on drawings.

2. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning.

a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.5 SHEET FLASHING

A. Provide EPDM synthetic rubber sheet except where metal is indicated.

B. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Nervastral Seal Pruf HD-20

2. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

C. Materials:

1. Elastic Sheet Flashing/Membrane: Manufacturer's standard flexible, elastic, black, nonreinforced, flashing sheet of 50 - 65 mils thickness.

2.6 MISCELLANEOUS MATERIALS & ACCESSORIES

A. Solder:

1. For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.

2. For use with stainless steel: Provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.

B. Fasteners: Same metal as flashing/sheet metal or, other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

C. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non- drying, nonmigrating sealant.

E. Epoxy Seam Sealer: 2-part noncrossive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.

F. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/ weather-resistant seaming and adhesive application of flashing sheet.

G. Paper Slip Sheet: 5-lb. rosin-sized building paper.

H. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.

I. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncrossive.

J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed,

noncrossive, size and gage required for performance.

K. Roofing Cement: Must be compatible with materials with which it comes in contact.

L. Provide precast concrete splashblock sloped away from building, approximately 12-inches wide x 24-inches long x 2-inches thick x 3-inches high, with 3-raised edges and one “open” end turned toward building – at locations where downspouts would otherwise drain on grade or paving.

1. Provide 1-preformed metal pan with corrugated bottom and properly hemmed edges (minimum 12” x 24”) at each downspout which drains onto a roof below.

2.9 FABRICATED UNITS

A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be

used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 2" deep, filled with mastic sealant (concealed within joints).

D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual".

1. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

B. Underlayment: Where aluminum is to be installed directly on cementitious or wood substrates,

install a slip sheet of red rosin paper and a course of polyethylene underlayment.

C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.

D. Install reglets to receive counter-flashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division-3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division-4 sections.

1. Install counter-flashing in reglets, either by snap-in seal arrangement, or by wedging in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

3.2 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.

B. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this section.

B. The applications for joint sealers as work of this section include the following:

1. Joints (Interior).
2. Joints (Exterior).
3. Flashing Joints.
4. Interior wall/ceiling joints.

C. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicted for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.

1.4 JOB CONDITIONS

A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature by manufacturer for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General: Manufacturers listed in this article include those known to produce the indicated category of prime joint sealant material, either as a nominally pure generic product or as an equivalent-performance modification thereof or proprietary product.

B. Manufacturers: The following manufacturer's products have been used to establish minimum standards for materials, workmanship and function:

1. Acrylic Emulsion Latex Sealants:
    a. Bostik.
    b. Pecora Corp.
    c. Sonneborn Building Products.
    d. Tremco, Inc.
2. Polyurethane Sealants:
    a. Bostik.
    b. Master Builders.
    c. Pecora Corp.
    d. Sonneborn Building Products.
    e. Tremco, Inc.

3. Butyl Sealants:
    a. Bostik.
    b. TEC Incorporated.
    c. Tremco, Inc.
4. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. NOTE: The use of silicone sealants shall not be used at any exterior conditions.

B. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component. (Silicone sealant shall not be used at exterior conditions).
    1. Color: Standard colors matching finished surfaces.
    2. Applications: Use for:
        a. Control, expansion, and soft joints in masonry, stone or concrete.
        b. Joints between concrete and other materials.
        c. Joints between metal frames and other materials.
        d. Other exterior joints for which no other sealant is indicated.

C. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
    1. Applications: Use for:
        a. Concealed sealant bead in sheet metal work.

D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, single component, paintable.
    1. Color: Standard colors matching finished surfaces.
    2. Applications: Use for:
        a. Interior wall and ceiling control joints.
        b. Joints between door and window frames and wall surfaces.
        c. Other interior joints for which no other type of sealant is indicated.

E. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, nonskinning.
    1. Applications: Use for concealed locations only:
        a. Sealant bead between top stud runner and structure and between bottom stud track and floor or wall.

F. Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, M and A; single component.
    1. Color: Standard color matching finished surfaces.
    2. Applications: Use for:
        a. Joints in sidewalks and paving, either vehicular or pedestrian.
        b. Isolation joints and control joints in slabs on grade.

G. Bituminous and Fiber Joint Filler (BtmF-JF) provide resilient and non-extruding type premolded bituminous-impregnated fiberboard units complying with ASTM D 1751; FS HH-F-341, Type I; or AASHTO M213.

H. Miscellaneous Materials:

1. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

2. Bond Breaker Tape (BB-Tp): Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

3. Sealant Backer Rod (S-BR): provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.

   a. Rod Size to Joint Width: Size of all backer rod width shall be 2 times the width of joint/gap to be sealed.

PART 3 - EXECUTION

3.1 INSPECTION

A. Installer must examine substrate, (joint surfaces) and conditions under which joint sealer work is to be performed and must notify Prime Contractor of unsatisfactory conditions.

3.2 JOINT PREPARATION

A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substrate which could interfere with seal of gasket or bond of sealant of caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

B. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown on specified, and except where manufacturer's technical representative directs otherwise.

B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealant. Do not leave voids or gaps between ends of joint filler units.

C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.

D. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.

E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.

F. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads;

G. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.

H. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever

means may be necessary to eliminate evidence of spillage.

I. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.

J. Bond ends of gaskets together with adhesive of “weld” by other means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners unless molded corner units are provided.

3.4 CURE AND PROTECTION

A. Cure sealants and caulking compounds in compliance with manufacturer’s instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Prime Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION

SECTION 08100 - STEEL DOORS AND FRAMES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:

1. Steel Doors
2. Steel Frames.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 4 Section "Unit Masonry" for building anchors into and grouting frames in masonry construction.
2. Division 8 Section " Wood Doors" for solid-core wood doors installed in steel frames.
3. Division 8 Section "Finish Hardware" for door hardware and weatherstripping.
4. Division 8 Section "Glazing" for glass in steel doors and sidelights.
5. Division 9 Section "Gypsum Board Assemblies".
6. Division 9 Section "Painting".

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

C. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

1. Indicate coordination of glazing frames and stops with glass and glazing requirements.

E. Samples for initial selection in the form of manufacturer's color charts showing the full range of colors available for factory-finished doors and frames.

F. Samples for verification of each type of exposed finish required, prepared on Samples not less than 3 by 5 inches (75 by 125 mm) and of same thickness and material indicated for final unit of Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

G. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

1.4 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for

Standard Steel Doors and Frames" and as specified.

B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E 152, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.

2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. Pioneer Industries

2. Rocky Mountain Metals, Inc.

3. Republic Doors & Frames/Allegion

4. Steelcraft - Allegion

2.2 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM A 569M).

B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366 (ASTM A 366M), commercial quality, or ASTM A 620 (ASTM A 620M)

C. Galvannealed Steel Sheets: Galvannealed Steel Sheet: ASTM A 653/ A 653M, commercial quality, hot dipped. Coating Thickness: A60 coating.

D. Supports and Anchors: Fabricated from not less than 0.0478-inch- (1.2-mm-) thick steel sheet; 0.0516-inch- (1.3-mm-) thick galvanized steel where used with galvanized steel frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

2.3 DOORS

A. Steel Doors: Provide 1-3/4-inch- (44-mm-) thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:

1. Interior Doors: Grade 2, heavy-duty, Model 1, visible edge seam design, 18 gauge / minimum 0.0478-inch thick cold-rolled steel sheet faces.

2. Exterior Doors: Grade 3, heavy-duty, Model 1, visible edge seam design, 16 gauge / minimum 0.0635-inch thick A60 galvannealed steel sheet faces.

B. Door Louvers: Provide louvers according to SDI 111C for interior doors where indicated, with blades or baffles formed of 0.0239-inch- (0.6-mm-) thick cold-rolled steel sheet set into minimum 0.0359-inch- (0.9-mm-) thick steel frame.

1. Sight-Proof Louvers: Stationary louvers constructed with inverted V- shaped or Y-shaped blades.

C. Low Profile Lite Kits: All lite kits must be minimum 18 ga. cold rolled steel, mitered and welded corners, welded reinforcing clips at corners, counter-sunk mounting screw- holes.

2.4 FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules.

B. Conceal fastenings, unless otherwise indicated. Fabricate frames as follows:

1. Fabricate frames with mitered or coped and face welded corners.

2. Interior Frames: 16 gage cold rolled steel

3. Exterior Frames: 14 gage A60 galvannealed steel.

C. Door Silencers: Except on weather stripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

D. Plaster Guards: Provide minimum 0.0179-inch- (0.45-mm-) thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

E. Grout: When required in masonry construction, as specified in Division 4 Section "Unit Masonry."

2.5 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

1. Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:

a. Interior Doors: 3/4" Cell Honeycomb

b. Exterior Doors: Insulated Polystyrene

2. Clearances:

a. Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors.

b. Not more than 3/4 inch (19 mm) at bottom.

c. Fire Doors: Provide clearances according to NFPA 80.

3. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

B. Galvannealed Steel Doors, Panels, and Frames: For the following locations, fabricate doors, panels, and frames from galvannealed steel sheet according to SDI 112.

1. At exterior locations.

2. Where indicated.

C. Close top and bottom edges of doors flush as an integral part of door construction or by addition of minimum 0.0635-inch- (1.6-mm-) thick galvanized steel channels, with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.

D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

E. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.

1. Unless otherwise indicated, provide thermal-rated assemblies with U- value rating of 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) or better

F. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier.

G. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

1. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions for fastening in top rail of doors or head of frames, as applicable.

H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

I. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

J. Glazing Stops: Minimum 0.0359-inch- (0.9-mm-) thick steel or 0.040-inch- (1-mm-) thick aluminum.

1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

2. Provide screw-applied, removable, glazing beads on inside of glass, louvers, and other panels in doors.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.

B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes. Apply primers and organic finishes to doors and frames after fabrication.

2.7 GALVANIZED STEEL SHEET FINISHES

A. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC- Paint 20.

B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply air-dried primer specified below immediately after cleaning and pretreatment.

1. Shop Primer: Zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II.

2.8 STEEL SHEET FINISHES

A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

B. Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.

C. Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.

B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
3. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
4. Install fire-rated frames according to NFPA 80.

A. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.

1. Fire-Rated Doors: Install with clearances specified in NFPA 80.
2. Smoke-Control Doors: Comply with NFPA 105.

3.2 ADJUSTING AND CLEANING

A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08211 - WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Solid core doors with wood veneer faces.
2. Factory finishing of flush wood doors.
3. Louvers for flush wood doors.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.

C. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for veneer matching and factory finishing and other pertinent data.

1. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.

D. Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:

1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.
2. Faces of factory-finished doors with opaque finish. Show the full range of colors available.

E. Samples for verification in the form and size indicated below:

1. Corner sections of doors approximately 12 inches (300 mm) square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with the following standard:

1. NWWDA Quality Standard: I.S.1-A, "Architectural Wood Flush Doors," of the National Wood Window and Door Association.
2. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.

B. Fire-Rated Wood Doors: Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.

1. Oversized Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate stating that doors conform to all standard construction requirements of tested and labeled fire-door assemblies except for size.
2. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

3. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 250 deg F (139 deg C) maximum in 30 minutes of fire exposure.

C. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE & HANDLING

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

1. Comply with Technical Bulletin 420-R for delivery, storage, and handling of doors.

B. Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

1.6 PROJECT CONDITIONS

A. Conditioning: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not conform to tolerance limitations of referenced quality standards.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.

2. Warranty shall be in effect during the following period of time after date of Substantial Completion.

a. Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors that may be incorporated in the Work (No other Manufacturer to be used unless prior approved by addenda)

B. Manufacturer: Subject to compliance with requirements, provide doors by one of the following:

1. Oshkosh Door Company; 2501 Universal Street, P.O. Box 2468, Oshkosh, WI 54904; Ph.: 920.233.6161; www.oshkoshdoor.com.

2. VT Industries; 1000 Industrial Park, P.O. Box 490, Holstein, IA 51025; Ph.: 712.368.4381; www.vtindustries.com.

3. Haley Brothers, Inc.; 6291 Orangethorpe Ave., Buena Park, CA 90620; Ph.: 714.670.2112; www.haleybros.com.

2.2 INTERIOR FLUSH WOOD DOORS

A. Solid Core Doors for Transparent Finish: Comply with the following requirements:

1. Faces: Plain Sliced White Birch, Book/Run Matching

2. Grade: Premium "A"

3. Construction: 5 ply, Hot Pressed
4. Core: Particleboard Core to meet or exceed ANSI/A208.1 for 1-LD-1 or 1-LD-2 door core
5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.
6. Pair Matching: Required at all pairs of doors.

B. Fire-Rated Solid Core Doors: Comply with the following requirements:

1. Faces and Grade: Provide faces and grade to match non-fire-rated doors in same area of building, unless otherwise indicated.
2. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
3. Edge Construction: Provide manufacturer's standard laminated-edge construction for improved screw-holding capability and split resistance compatible hardwood
4. Pairs: Furnish formed-steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated.
5. Pairs: Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

2.3 FABRICATION

A. Fabricate flush wood doors to comply with following requirements:

1. In sizes indicated for job-site fitting.
2. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:
    a. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-resistance-rated doors.
3. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
    a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
    b. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

B. 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.

2.4 SHOP PRIMING

A. Transparent Finish: Shop-seal faces and edges of doors for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified.

2.5 FACTORY FINISHING

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.

1. Grade: Premium.
2. Finish: AWI System TR-6 or better in Factory standard color as directed by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine installed door frames prior to hanging door:

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

2. Reject doors with defects.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation see Division 8 Section "Door Hardware."

B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.

C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

1. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch (3.2 mm) at jambs and heads, 1/16 inch (1.6 mm) per leaf at meeting stiles for pairs of doors, and 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch (6.4-mm) clearance from bottom of door to top of threshold.

2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.

3. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.

4. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish after installation, if fitting or machining is required at the job site.

3.3 ADJUSTING AND PROTECTION

A. Operation: Re-hang or replace doors that do not swing or operate freely.

B. Finished Doors: Refinish or replace doors damaged during installation.

C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 08220 – FIBERGLASS REINFORDED PLASTIC (FRP) DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCIPTION OF WORK

A. The extent of each type of door is shown on the drawings and schedules. The following types of doors are required:

1. Fiberglass Reinforced Plastic (FRP) Doors.

1.3 QUALITY ASSURANCE

A. Manufactures Certification: Manufacturer is to have a minimum of 25 years experience in the production of pre-hardwared and pre-assembled door systems, using the type of materials specified for this project.

B. Installers Qualifications: For the installation of the entrance systems, use only mechanics who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation plus the requirements of this work.

1.4 WARRANTY

A. Warranty all fiberglass doors for a period of 10 years against failure due to corrosion. Additionally, warranty all fiberglass doors on materials and workmanship for a period of 10 years, including warp, separation or delaminating and expansion of the core.

1.5 TEST REPORTS AND PERFORMANCE REQUIREMENTS FOR ALUMINUM HYBRID FRP NARROW STILE DOORS – HURRICANE RATED

A. Entrance systems must comply with requirements for system performance characteristics as determined by the testing methods that follow:

1. Two copies of current test reports covering the test procedures as listed are to be included with the submittals.

B. Complete System Requirements Test: Complete system units that include door, frame and hardware are to meet the following criteria:

1. FBC Protocol for TAS 201; TAS 202; TAS 203 – Pass, and the following additional minimum criteria in conjunction with the qualifications as outlined by previously referenced standards:

a. Thermal Transmittance Tests:

1) U-factors expressed in Btu/ hr-ft (2)-F - AAMA 1503-98 - 0.58

2) R-value expressed in hr-ft (2)-F/Btu - ASTM 1503-98 - 1.73

b. Structural Performance Tests:

1) Air Infiltration –

ASTM E283 @ 1.56 psf (25 mph) - 0.41 cfm/ft (2)

ASTM E283 @ 6.24 psf (50 mph) – 1.06 cfm/ft (2)

2) Water Penetration –

ASTM E331 - 15 Min Cycle - NO ENTRY

3) Uniform Static Load for single door- ASTM E330 - (+) - 195.0

c. Structural Integrity Tests:

1) Exit Bar Pull Off Test - 1300 lbs. minimum load resistance before exit bar disengages from door.

2) Closer Pull Off - 1638 lbs. minimum load resistance before closer disengages from door.

d. Windborne Debris Resistance Tests:

1) Large Missile Impact Test - SFBC PA 201 - 94 – PASSED

2) Cyclic Wind Pressure Test - SFBC PA 203 - 94 - 65PSF

3) Forced Entry Test - SFBC 3603.2 - 300 lbs. – PASSED

e. Indoor Air Quality Test: ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.

C. Face Sheet Requirements Test: FRP material and FRP face sheets with core material are to meet the following criteria:

1. Center Door Section (face sheet/core/face sheet) Gardner Impact Test – Nominal Value, ASTM D 3029 120 in-lb.

2. FRP Material (MR85)

a. Flexural Strength Test – ASTM D790 - 22,600 psi (inward) 24,400 psi(outward)

b. Izod Impact Strength Test – ASTM D256 - 15.36 ft-lb./in thickness

c. Barcol Hardness – ASTM D2583 – 50

1.6 SUBMITTALS

A. Product Technical Data Including:

1. Acknowledgment that products submitted meet requirements of standards referenced.

2. Manufacturer shall provide certificate of compliance with current local and federal regulations as it applies to the manufacturing process.

3. Manufacturer’s installation instructions.

4. Schedule of doors indicating the specific reference numbers used on the owner’s project documents, noting door type, frame type, size, handing and applicable hardware.

5. Details of core and edge construction, including factory construction specifications.

6. Certification of manufacturer’s qualifications.

B. Submittal Drawings for approval shall be submitted prior to manufacture and shall include the following Information and formatting:

1. Summary door schedule indicating the specific reference numbers as used on owner’s drawings, with columns noting door type, frame type, size, handing, accessories and hardware.

2. A drawing depicting front and rear door elevations showing hardware with bill of material for each door.

3. Drawing showing dimensional location of each hardware item and size of each door.

4. Individual part drawing and specifications for each hardware item and FRP part or product.

5. Construction and mounting detail for each frame type.

1.7 DELIVERY, STORAGE AND HANDLING

A. Each door shall be delivered individually crated for protection from damage in cardboard containers, clearly marked with project information, door location, specific reference number as

shown on drawings, and shipping information. Each crate shall contain all fasteners necessary for installation as well as complete installation instructions.

1. Doors shall be stored in the original container on edge, out of inclement weather for protection against the elements.
2. Handle doors pursuant to the manufacturer's recommendations as posted on outside of crate.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Special-Lite - SL-17 HR Series, FRP/Aluminum Hybrid
2. Special-Lite – SL 260 Aluminum Frames

B. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

C. NOTE: Manufacturer must meet all technical requirements listed herein.

D. Door Systems Classifications: Door systems for this project are based on criteria as cited for Systems meeting FBC Protocols TAS 201, 202, 203. Doors were tested as a unit and as such, to meet specified criteria all specifications regarding frame and door size must be met and testing documentation outlining the unit specifics as tested must be provided.

2.2 MATERIALS

A. Aluminum Members:

1. Doors, frames, miscellaneous components and entrance systems accessories are to be from the same manufacturer. Splitting the source for these items will not be permitted.
2. Provide alloy and temper as recommended for resistance to corrosion and color control. Aluminum member references are ASTM B 221 for extrusions and ASTM B 209 for sheets.

2.3 ALUMINUM FRAMES

A. Standard Closed Back Frames shall be of extruded aluminum 6063-T5 alloy and a wall thickness of .125".

1. Vertical Members: All vertical frame jambs and mullions will be full height of opening.
2. Sections: Tube sections will be 2" x 4 1/2" with joints connected by use of reinforcing clips and machine screws.
3. Finish to be determined by architect.
4. Closed Back Frames are: CDS Model 2400 or equal

2.4 FIBERGLASS NARROW STILE HURRICANE RATED ALUMINUM HYBRID (FRP) DOORS

A. Structural Main Frame: Doors have an aluminum main frame constructed from extruded aluminum 6063 - T5 alloy. Doors are 1 3/4" thick. Main-frame tube is to be a single extruded unit measuring 1 1/2" x 2 1/2" (O.D.) on Sides; Bottom and top rail with a 6" (O.D.) tube.

B. Main Frame Stile Wall Thickness:

1. Side Stiles Minimum 1/8" thick hinge edge wall.
2. Side Stiles Minimum 1/8" thick face walls.
3. Bottom Rail Minimum 1/8" thick face walls.

4. Top Rail Minimum 1/8” thick all walls.

C. Main Frame Joinery: Assembly for the meeting joints of the Rails and Stiles on the main-frame are to include the following:

1. Tie rods inserted into top and bottom rails.
2. Mortise & Tenon with four-point connect fasteners (per joint).
3. **WELDED JOINTS WILL NOT BE ACCEPTED**

D. Face Sheets: Face sheets will be fiberglass reinforced polyester, .120” thick, and have a pebble-like embossed finish. Face sheet color will be selected from manufacturer's standard color chart.

E. FRP face sheets are MR85 HIGH IMPACT FRP MATERIAL that has been tested by ASTM S5420 Gardner Impact Test with ”Mean Failure Energy” rating no lower than 411.84 in-lb. (or equal).

F. Core Material: Core material will be 5-lb. density polyurethane with a flame spread rating of no more than 25.

1. URETHANE CORE DOORS will require a letter from the manufacturer offering a special guarantee that the FRP face sheets will not delaminate (bubble) for a period of 25 years, AND that the manufacturer will cover ALL replacement costs if delamination does occur.

G. Edge Trim: Stile Edge Trim is an INTEGRAL part of the main frame and interlocks with the panel. Top and bottom edge trim is removable.

1. Snap on edge trim will not be accepted.

H. Weather Stripping: Weather stripping package as provided by door manufacturer as tested and passed with unit.

I. Hardware Reinforcing: Closer reinforcing to be 1/8” minimum aluminum plate or channel. Surface Applied Exit Device reinforcing to be 1/8” aluminum channel.

J. Narrow Stile Hurricane (FRP) Doors are by one of the following:

1. Basis of Design: Commercial Door Systems F200-HR
2. Approved Manufacturer: SPECIAL LITE, Hurricane Rated Model SL-17 (must provide proof of test reports to confirm hardware configuration for each set of specified hardware passes TAS protocol 201, 202, 203)

K. Vision Lites:

1. Vision lite trim moldings will be aluminum extrusion - 6063-T5 alloy and removable from the inside only.
2. Door Vision Lites will be Factory glazed with hurricane tested glass size
3. Hurricane Rated Vision Lite not to exceed 22” x 32” inches
4. Door Vision Lite Kits are by THE DOOR MANUFACTURER ONLY.

2.5 HARDWARE

A. Hardware locations to be templated as tested for Hurricane approval.

B. Refer to specification section 08700 for hardware requirements.

PART 3 - EXECUTION

3.1 VERIFICATION

A. Verification of Conditions:

1. Verify openings are correctly prepared to receive doors and frames.

2. Verify openings are correct size and depth in accordance with submittal drawings.

B. Installer's Examination:

1. Door installer shall examine conditions under which construction activities of this section are to be performed and submit a written report to general contractor if conditions are unacceptable.

2. General Contractor shall submit two copies of the installer's report to the architect within 24 hours of receipt.

3. Installer shall not proceed with installation until all unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Doors shall be delivered at job site individually crated. Each crate to be clearly marked with the specific opening information for quick and easy identification.

B. All single doors to be shipped completely assembled in the frame with hardware installed. Double doors to be prehung at the factory to ensure a proper fit and that hardware functions properly, then disassembled for shipping purposes.

C. Install door opening assemblies in accordance with shop drawings and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.

D. Field alteration of doors or frames to accommodate field conditions is strictly prohibited. Site tolerances: Maintain plumb and level tolerance specified in manufacturer's printed installation instructions.

E. Fire labeled doors, frames and any associated hardware must be installed by qualified professional installers in strict accordance with manufacturer's instructions and the latest revision of NFPA 80.

3.3 ADJUSTING

A. Adjust doors in accordance with the door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instruction.

3.4 CLEANING

A. Clean surfaces of door opening assemblies and exposed door hardware in accordance with respective manufacturer's maintenance instructions.

3.5 PROTECTION OF INSTALLED PRODUCTS

A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

END OF SECTION

SECTION 08410 - ALUMINUM STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of aluminum entrances and storefronts is indicated on drawings and schedules.

B. Types of aluminum entrances required include the following:

1. Storefront type framing system for exterior applications.

2. Impact Resistant Exterior Storefront Door Frames.

C. Glazing: Refer to “Glass and Glazing” section of Division 8 for glazing requirements for aluminum entrances and storefronts specified herein to be factory pre-glazed.

1.3 SYSTEM PERFORMANCES

A. General: Provide exterior entrance and storefront assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below as demonstrated by testing manufacturer’s corresponding stock systems according to test methods designated. System shall be of design styles indicated. System components and accessories shall be from the same manufacturer to the maximum extent possible.

B. Thermal Movement: Allow for expansion and contraction resulting from ambient temperature range of 120-degree F.

C. Wind Loading: Provide capacity to withstand loading indicated below, tested per ASTM E 330.

1. Uniform pressure of 20 psf inward and 20 psf outward.

D. Transmission Characteristics of Fixed Framing: Comply with requirements indicated below for transmission characteristics and test methods.

1. Air and Water Leakages: Air infiltration of not more than 0.06 CFM per sq. ft. of fixed area per ASTM E 283 and no uncontrolled water penetration per ASTM E 331 at pressure differential of 6.24 psf (excluding operable door edges).

2. Condensation Resistance: Not less than 51 CRF per AAMA 1502.7.

3. Thermal Transmittance: U-value of not more than 0.65 Btu/(hr x sf x degree F) per AAMA 1503.1.

E. Transmission Characteristics of Entrances: Provide entrance doors with jamb and head frames which comply with requirements indicated below for transmission characteristics and test methods.

1. Air Leakage: Air infiltration per linear foot of perimeter crack of not more than 0.50 CFM forsingle doors and 1.0 CFM for pairs of doors per ASTM E 283 at pressure differential of 1.567 psf.

2. Condensation Resistance: Not less than 48 CRF per AAMA 1502.7.

3. Thermal Transmittance: U-value of not more than 0.93 Btu/(hr x sf x degree F) per AAMA 1503.1.

1.4 QUALITY ASSURANCE

A. Drawings: Plans, elevations and details show spacings of members as well as profile and similar dimensional requirements of aluminum entrances and storefront work. Minor deviations will be accepted in order to utilize manufacturer’s standard products when, in Architect’s sole judgment, such deviations do not materially detract from design concept or intended performances.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, standard details, and installation recommendations for components of aluminum entrances and storefronts required for project, including test reports certifying that products have been tested and comply with performance requirements.

B. Samples: Submit samples of each type and color of aluminum finish on 12" long sections of extrusions or formed shapes and on 6" square sheets. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations.

PART 2 - PRODUCTS

2.1 ALUMINUM DOORS, FRAMES & STOREFRONTS

A. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Kawneer North America
2. Tubelite, Inc.
3. Coral Industries, Inc./Coral Architectural Products
4. YKK AP America, Inc.
5. Oldcastle
6. Record

B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS AND ACCESSORIES

A. Aluminum Members: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B 221 for extrusion, ASTM B 209 for sheet/plate.

B. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components.

1. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal.
2. Provide Phillips flat-head machine screws for exposed fasteners.

C. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum, 0.062" minimum, of an alloy and type selected by manufacturer for compatibility with other components.

D. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible; otherwise, non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.

E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.

F. Bituminous Coatings: Cold-applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.

G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of either molded neoprene gaskets complying with ASTM D 2000 or molded PVC gaskets complying with ASTM D 2287.

H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

I. Glass and Glazing Materials: Provide glass and glazing materials which comply with requirements of “Glass and Glazing” section of these specifications.

2.3 HARDWARE

A. General: Hardware shall comply with requirements of the “Americans with Disabilities Act”. Refer to hardware section of Division 8 for requirements for hardware items other than those indicated herein to be provided by manufacturer of aluminum entrances.

1. Push/Pull Handles: CO-9 design, by Kawneer. Finish as per the Door Schedule.

2. All other hardware shall be as per Section 08700, Finish Hardware.

2.4 FRAMING

A. Types:

1. Storefront type framing system for non-insulated interior applications:

a. Framing system shall be equal to TriFab Versaglaze 450, by Kawneer.

2. Impact Resistant Exterior Storefront Frames:

a. Framing system shall be equal to IR 501, by Kawneer, Impact Resistant Storefront Framing Systems, Insulated.

B. General:

1. Support Members: Extruded aluminum alloy 6063-T6 or 6061-T6 complying with ASTM B-221.

2. Flashing/Closures: Formed aluminum 5005-H34 alloy, min. thickness .040”, complying with ASTM B-209.

3. Cap System: Manufacturer’s standard cap glazing system consisting of rectangular (rafter) and beveled (horizontal) glazing gaps which will secure all sides of each light of glass against negative and positive loads.

4. Fasteners: A300 stainless steel.

5. Sealant: Silicone (FS TT-S-0015 43A and TT-S-0023 o.c.)

2.5 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.

B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.

1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.

2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.

3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.

C. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.

D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion.

E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

F. Fasteners: Conceal fasteners wherever possible.

G. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops; at other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.

1. Provide EPDM/vinyl blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

2.6 STOREFRONT FRAMING SYSTEM

A. General: Provide inside-outside matched center glazed system with provisions for glass replacement. Shop-fabricate and preassemble frame components where possible.

2.7 FINISHES

A. Baked Enamel Finish: Premium color selection equal to Kawneer #22 Stock Permafluor Architectural Coating (Hylar 5000 or Kynar 500), factory applied, and oven baked for a topcoat thickness of 1.0 - 1.3 mils.

1. Color to be selected by Architect after bid date from manufacturer's standards.

2. Color selections MUST include "White".

PART 3 - EXECUTION

3.1 PREPARATION

A. Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work.

3.2 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of aluminum entrances.

B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

C. Drill and tap frames and apply surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

D. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.

E. Refer to "Glass and Glazing" section of Division 8 for installation of glass and spandrel panels indicated to be glazed into framing, and not preglazed by manufacturer.

3.3 ADJUST AND CLEAN:

A. Adjust operating hardware to function properly, without binding, and to prevent tight fit at contact points and weatherstripping.

B. Clean completed systems, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and joint sealants, dirt, and other substances from aluminum surfaces.

C. Institute protective measures and other precautions required to assure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

B. This Section includes the following:

1. Hinges.
2. Key control system.
3. Lock cylinders and keys.
4. Lock and latch sets.
5. Bolts.
6. Exit devices.
7. Push/pull units.
8. Closers.
9. Overhead holders.
10. Miscellaneous door control devices.
11. Door trim units.
12. Protection plates.
13. Weather-stripping for exterior doors.
14. Sound stripping for interior doors.
15. Astragals or meeting seals on pairs of doors.
16. Thresholds.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 8 Section "Standard Steel Doors and Frames" for silencers integral with hollow metal frames.
2. Division 8 Section "Flush Wood Doors" for factory pre-fitting and factory pre-machining of doors for door hardware.
3. Division 8 Section "Aluminum Entrances and Storefronts" for aluminum entrance door hardware, except cylinders.

1.3 HARDWARE ALLOWANCE

A. Allowance of $2,500.00 for Certified AHC (Architectural Hardware Consultant) & FDAI (Fire Door Assembly Inspector – document of certification from DHI must be provided) to visit job site upon substantial completion as directed by Architect. A written report will be required for the Owner, Architect, and Contractor.

1.4 QUALITY ASSURANCE

The supplier must have demonstrated willingness to coordinate field problems, and (upon reasonable compensation) to assist the Owner in re-keying and service operations. He must have a reputation for supplying quality material. Pre-bid approval is required **by Addendum** 10 days in advance of the Bid Day. The following Suppliers are accorded such approval in advance:

a. Brabner & Hollon; Mobile, AL
b. Mullins Building Products; Montgomery, AL
c. Rayford & Associates, Inc.; Mobile, AL
d. Kelley Bros.; Daphne AL

1.5 SUPPLIER

A. Door hardware supplier's responsibilities shall be as follows:

1. Submittals: Submit through Contractor required product data, final hardware schedule;

   separate keying schedule, and samples as specified in this Section, unless otherwise indicated.

2. **Hardware Review Meeting**: Hardware Supplier shall attend a scheduled “Hardware Review Meeting” with the Contractor, Owner and Architect representative. All Hardware products, hardware installation locations, finishes, color selections, ratings and keying is to be reviewed and discussed. The Hardware Supplier understands the Hardware Submittal is not deemed “Fully Approved” until the Owner has completed their review and given “Approval”.

3. Construction Schedule: Inform Contractor promptly of estimated times and dates that will be required to process submittals, to furnish templates, to deliver hardware, and to perform other work associated with furnishing door hardware for purposes of including this data in construction schedule. Comply with this schedule.

4. Coordination and Templates: Assist Contractor as required to coordinate hardware with other work in respect to both fabrication and installation. Furnish Contractor with templates and deliver hardware to proper locations.

5. Product Handling: Package, identify, deliver, and inventory door hardware specified in this Section.

6. Discrepancies: Based on requirements indicated in Contract Documents in effect at time of door hardware selection, furnish types, finishes, and quantities of door hardware, including fasteners, and Owner's maintenance tools required to comply with specified requirements and as needed to install and maintain hardware. Furnish or replace any items of door hardware resulting from shortages and incorrect items at no cost to the Owner or Contractor. Obtain signed receipts from Contractor for all delivered materials.

B. Contractor's responsibilities shall be as follows:

1. Submittals: Coordinate and process submittals for door hardware in same manner as submittals for other work.

2. **Hardware Review Meeting**: Contractor is to schedule and attend a “Hardware Review Meeting” with the Owner, Hardware Supplier and Architect Representative. All Hardware products, hardware installation locations, finishes, color selections, ratings and keying is to be reviewed and discussed. The Contractor understands the Hardware Submittal is not deemed “Fully Approved” until the Owner has completed their review and given “Approval”.

3. Construction Schedule: Cooperate with door hardware supplier in establishing scheduled dates for submittals and delivery of templates and door hardware. Incorporate in construction schedule the times and dates related to furnishing hardware by door hardware supplier.

4. Coordination: Coordinate door hardware with other Work. Furnish hardware supplier or manufacturer with shop drawings of other work where required or requested. Verify completeness and suitability of hardware with supplier. Coordinate all wiring, raceways, accesses and final connections to all electronic devices and components per manufacturer requirements for a fully functioning system.

5. Product Handling: Provide secure lock-up for hardware delivered to the site. Inventory hardware jointly with representative of hardware supplier and issue signed receipts for all delivered materials.

6. Installation Information: The general types and approximate quantities of hardware required for this Project are indicated at the end of this Section in order to establish Contractor's costs for installation and other work not included in allowance.

7. No adjustments in Contract sum will be made for costs other than those covered by the allowances for subsequent increases or decreases in quantity of one or more hardware types that do not exceed 5 percent.

1.6 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Upon return of the reviewed finish hardware schedule, arrange for a meeting with the Owner and representatives of Architect. A keying schedule will be established and submitted to the Architect and Owner. After review, the keying schedule will be returned to representatives of Finish Hardware Supplier so that permanent cylinders and keys can be prepared on a timely basis.

1.7 QUALITY ASSURANCE

A. Substitutions: All substitution requests must be submitted before bidding and within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his hardware consultant.

B. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

C. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for a minimum of 10 years, for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced “ Certified “architectural hardware consultant (AHC)“ as recognized by the Door and hardware Institute (DHI). All submittals shall be signed by an AHC who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door

hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.8 PRODUCT HANDLING

A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.9 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 HINGES

A. MANUFACTURERES

1. Hager
2. McKinney
3. Stanley

B. MATERIAL:

1. Provide only template produced units
2. Provide Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head wood screws for installation of units in to wood. Finish screw heads to match surface of hinges or pivots.
3. Hinge pins, except as noted, are to be provided as follows:
    a. Steel Hinges: Steel pins
    b. Non-ferrous Hinges: Stainless steel pins
    c. Exterior Doors: Use Non-Removable Pins
    d. Interior Doors: Non-rising pins
    e. Electric Hinges: Non-removable pins

4. Tips shall be flat button and matching plug, finished to match leaves.
5. Provide number of hinges indicated but not less than three (3) hinges for door leaf of 90” or less in height and one additional hinge for each 30” of additional height.
6. Provide ball bearing hinges of the type and weight suggested by the hinge manufacturer for each type of door application.

2.2 CONTINOUS GEARED HINGES

A. MANUFACTURERES
   1. Hager Companies
   2. ABH Manufacturing
   3. SELECT Products Ltd
   4. Stanley
   5. National Guard Products

B. MATERIAL:
   1. Fully Concealed Hinges, Heavy Duty
   2. Conform to ANSI/BHMA A156.26-2006 Grade 1.
   3. Typical hinge height shall be 1" less than nominal door height.

2.3 LOCK CYLINERS AND KEYING

A. MANUFACTURERES
   1. All cylinders must be keyed to the existing system for **Saraland City Schools**

B. MATERIAL
   1. Keys shall be furnished as follows:
      a. 3 each Change Keys per core/or keyed alike group
      b. 3 each Grand Master Key
      c. 3 each Master Key per level
      d. 3 each Control Key
   2. Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall expansion capacity of 150% of the number of locks required for the project.

2.4 LOCKSETS AND LATCHSETS

A. MANUFACTURERES
   1. Stanley/Best 9K3 Series, 14D Design
   2. No Sub – Owners Standard

B. MATERIAL

1. Locksets and latch-sets of all manufacturers must conform to the requirements of Sub paragraphs 2 and be approved by the Architect.
2. Cylindrical Lock Type
    a. Locksets and latch sets must conform to ANSI A156.2 Series 4000, Operational Grade 1, and be UL Listed.

       OR
3. Mortise Type
    a. Locksets and latch sets must conform to ANSI A156.2 Series 1000, Grade 1, and be UL Listed
    b. Locksets and latch-sets must be heavy duty mortise type with 2-3/4 in. backset, or greater as specified, with a 3/4 inch throw latch-bolt.
    c. Locksets shall be furnished with a cylinder housing that accepts a small format interchangeable core. Cores must be furnished by Best Access Systems.
    d. Trim to be 14D Design.

2.5 EXIT DEVICES

A. MANUFACTURERES
1. Sargent 8800 Series x ET Trim Design
2. Best/Precision Apex 2000 Series x 4900D Trim Design
3. Von Duprin 98/99 Series x 996L Trim Design

B. MATERIAL
1. All exit devices to be of one manufacturer and provided in same finish and lever design as locksets.
2. Provide sex nuts and bolts for attachment of surface applied items to doors.
3. Devices shall be UL listed. Devices for fire rated openings shall bear factory installed UL markings that indicate approval for fire rated openings.
4. All exit devices shall be touch-bar type design and Grooved aluminum extrusions are not allowed.
5. All exit devices shall comply with ANSI A156.3, Grade 1.
6. Exit devices must meet hurricane code where required.
7. Exit device lever trim shall be equal to 14D design.

2.6 CLOSERS

A. MANUFACTURERES
1. LCN – 4040XP Series
2. Stanley/Best – HD8000 Series
3. Hager Companies - 5100 Series

B. MATERIAL

1. Size of units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

    a. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.

    b. Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units, ANSI opening force and delayed action closing.

2. Provide manual closers that are certified to exceed ten million (10,000,000) full load operating cycles by a recognized independent testing laboratory. Closers are to be fully hydraulic, rack and pinion action with high strength cast aluminum or cast iron cylinders and one piece forged steel pistons. Hydraulic fluid to be of a type requiring no seasonal adjustments for temperature. Hydraulic regulation to be controlled by tamper-proof, non-critical screw values, adjustable with a hex by tamper-proof, non-critical screw valves, adjustable with a hex wrench. Separate adjustments for back check, general speed, and latch speed. Where detailed on double lever arm closers, provide a delayed action feature to delay closing up to one minute for maximum opening to approximately 75 degrees. Back check shall be properly located for protection of the door, frame and applied hardware.

2. Use of closers with built-in spring or cushion stops will be allowed in lieu of overhead stops.

3. All door closers shall comply with ANSI A156.4 Grade 1 and meet the standards of ANSI A117.1 for barrier-free accessibility.

2.7 OVERHEAD STOPS AND HOLDERS

A. MANUFACTURERES

1. Dormakaba
2. ABH Manufacturing
3. Hager Companies

B. MATERIAL

1. Conform to ANSI A156.8 Grade 1.
2. Surface Mount, Heavy or Medium Duty (refer to hardware sets)

2.8 PUSH/PULLS & PROTECTION PLATES

A. MANUFACTURERES

1. Hager Companies
2. Burns Mfgr.
3. Trimco Hardware

B. MATERIAL

1. Provide manufacturers standard exposed fasteners for installation, through bolted for matched pairs, but not of single units.
2. Provide 16 gauge minimum thickness for plates.
3. Where specified in the schedule, push/pulls shall have an antimicrobial coating.

2.9 THRESHOLDS, WEATHERSTRIPPING & GASKETING

A. MANUFACTURERES

1. Zero
2. Hager
3. National Guard

B. MATERIAL

1. Provide continuous weather-stripping at each edge of every exterior door leaf, except as otherwise indicated.
2. Provide type, size and profile shown as scheduled.
3. Provide non-corrosive fasteners as recommended by manufacturer for application indicated. Do not specify adhesive backed weather-strip or gasket material.
4. Where replaceable seal strips are scheduled, provide only those units where resilient or flexible seal strip is easily replaceable from stocks maintained by manufacturer.
5. Proved standard metal threshold unit of type, size and profile shown as scheduled.

2.10 FINISHES

A. Hardware finishes shall conform to ANSI and shall be as listed below for aluminum, FRP, hollow metal and wood doors:

B. Finishes Table:

Butt Hinges	652 Satin Chrome Plated Steel
Continuous Geared Aluminum Hinges	628 Clear Anodized Aluminum, except at aluminum storefront doors. At Aluminum storefront doors, provide anodized or Kynar finish as required to match specified door finish.
Cont. Pin & Barrel Hinges	630 Satin Stainless Steel
Flush Bolts	626 Satin Chrome Plated
Locksets	626 Satin Chrome Plated
Exit Devices	630/626 Satin Chrome Plated
Door Closers	689 Powder Coat Aluminum
Push Plates	630 Satin Stainless Steel
Pull Plates	630 Satin Stainless Steel
Protective Plates	630 Satin Stainless Steel
Door Stops	626 Satin Chrome Plated
Overhead Holders	630 Satin Stainless Steel

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install each hardware item in compliance with manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted of finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item.

1. Do not install surface mounted items until finishes have been completed on the substrate.

B. Conform to ANSI A117.1 for positioning requirements for the handicapped.

3.2 PROTECTION AND CLEANING

A. After installation, clean metal surfaces on both interior and exterior of all mortar, paint and other contaminants. After cleaning, protect work against damage.

3.3 FINAL ADJUSTMENT

A. Whenever hardware is installed more than one month prior to occupancy or acceptance, return during the week prior to acceptance or occupancy and make a final inspection and adjustment of all hardware items in such space or area.

3.4 HARDWARE SCHEDULE

Manufacturer List

Code	Name
AB	ABH Manufacturing Inc.
BE	Best Access Systems
NA	National Guard
PR	Precision/Best
BE	Best Door Closers
SP	Special Lite
ST	Stanley
HA	Hager

Option List

Code	Description
C4	CAM-STANDARD CAM
CD	CYLINDER DOGGING
HC	Hurricane Code Device
SN	Sex Nuts (Pkg. of 4)
B4E	BEVELED 4 EDGES - KICK PLATES
CSK	COUNTER SINKING OF KICK and MOP PLATES
LBR	LESS BOTTOM ROD
MCS822	Mullion Cap Spacer (600 Finish)
S301	OPT. ROLLER. STRK - RIM AND TOP OF SVR
CA-03	Cylinder Attachment Kit (Rim/SVR Device)
SNB (2)	SEX BOLTS (2)
SNB (6)	SEX BOLTS (6)

Finish List

Code	Description
C	Clear Anodized Aluminum
AL	Aluminum
600	Primed for Painting
626	Satin Chromium Plated
630	Satin Stainless Steel
689	Aluminum Painted
BLACK	Black
US26D	Chromium Plated, Dull
US32D	Stainless Steel, Dull

Hardware Sets

SET #E01

Single Exterior Entry FRP Door: 100, 100A, 200, 200A.

1 Continuous Hinge	661HD UL LAR	AL	ST
1 Exit Device	HC2103 36" CA-03 CD S301 SNB (2)	630	PR
1 Rim Cylinder	12E-72 STD	626	BE
1 Mortise Cylinder	1E-74 STD C4	626	BE
1 Flush Pull	SL86	C	SP
1 Construction Core	1C-7 Green	GN	BE
1 Door Closer	HD8016 S-DST	689	BE
1 Door Sweep	750SN x LAR		HA
1 Threshold	520S N x LAR		HA

NOTE: Flush Pulls supplied, and Factory installed by Special-Lite.
NOTE: Weather-seals are Factory installed in Tube Frames by Special-Lite.

SET #01

Interior Single Office Door: 101, 201.

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Office Lockset	9K3-7AB14D S3 STD	626	BE
1 Construction Core	1C-7 Green	GN	BE
1 Wall Bumper	236W	630	HA
3 Silencers	307D	Grey	HA

SET #02

Interior Single Door: 102, 103, 202, 203.

3 Hinges	FBB179 4 1/2 X 4 1/2	26D	ST
1 Storage Lockset	9K3-7D14D S3 STD	626	BE
1 Construction Core	1C-7 Green	GN	BE
1 Wall Bumper	232W	630	HA
3 Silencers	307D	Grey	HA

NOTE: ALL HARDWARE BY DOOR SUPPLIER.

NOTES:

A) INSTALL ALL DOOR CLOSERS AWAY FROM CORRIDORS AND PUBLIC VIEW.
B) ALL EXTERIOR & INTERIOR CYLINDERS AND LOCKSETS TO HAVE KEYED CONSTRUCTION CORES THROUGH-OUT THE CONSTRUCTION PHASE.

END OF SECTION 087100

SECTION 08800 – GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for windows
2. Glass for doors
3. Glass for interior borrowed lites
4. Glass for storefront framing.
5. Glazing sealants and accessories.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass as defined in referenced glazing publications.

B. Glass Fabricators: Firms that produce the fabricated glass products. Fabrication processes include cutting, heat processing, insulating, spandrel, laminating and other as fabrication activities defined in referenced glazing publications.

1.3 REFERANCE STANDARDS

A. American Society of Test and Material (ASTM)

1. ASTM C1036: Standard Specification for Flat Glass
2. ASTM C1048: Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass
3. ASTM C1172: Standard Specification for Laminated Architectural Flat Glass
4. ASTM C1376: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
5. ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials
6. ASTM E1886: Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
7. ASTM E1996: Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
8. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation

B. American National Standards Institute (ANSI)

1. ANSI z97.1: For Safety Glazing Materials Used In Buildings - Safety Performance Specifications And Methods Of Test

C. Consumer Products Safety Commission

1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials

D. International Code Council

1. ICC 500: ICC/NSSA Standard for the Design and Construction of Storm Shelters

E. Underwriters Laboratory (UL)

1. UL 263: Standard for Fire Tests of Building Construction and Material
2. UL 9: Standard for Fire test of Window Assemblies
3. UL 10B: Standard for Fire Tests of Door Assemblies

4. UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies

F. National Fire Protection Association (NFPA)

1. NFPA 80: Standard for Fire Doors and Other Opening Protectives
2. NFPA 257: Standard on Fire Test for Window and Glass Block Assemblies
3. NFPA 252: Standard Methods of Fire Test of Door Assemblies

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product provide performance characteristics, certificates of compliance, installation instructions, and cleaning and maintenance instructions.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12” x 12” inches (300 mm) square. For each type of sealant/gasket exposed to view; 12” length sample. Install sealant/gasket sample between two strips of materials representative of adjoining framing system in color.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. 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. Preconstruction adhesion and compatibility test report.

1.7 QUALITY ASSURANCE

A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

B. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated

1.8 PRECONSTRUCTION TESTING

Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials form effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.10 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in the middle third of manufacturer's recommended installation temperature range.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: 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 for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five (5) years from date of Substantial Completion.

C. Manufacturer's Special Warranty for 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 MANUFACTURERS

A. Approved Manufacturers: Subject to compliance with requirements, provide AGC Glass North America, Inc or approved equal product by one of the following:

1. AGC Glass North America (Basis of Design)
2. Pilkington North America
3. Viracon

B. Approved Fabricators: Subject to compliance with requirements

1. American Insulated Glass
2. OldCastle Building Envelope
3. Trulite Glass and Aluminum Solutions
4. Tristar Glass

2.2 PERFORMANCE REQUIREMENTS

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

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Snow Loads: As indicated on Drawings.

C. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with protection testing requirements in ASTM E 1996 for Wind Zones when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.

1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.
2. Small-Missile Test: For glazing located more than 30 feet (9.1 m) above grade.

E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

F. 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. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 7.3 computer program, expressed as Btu/sq. ft. x h x deg F.
2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBNL's WINDOW 7.3 computer program.
3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: “Laminated Glazing Reference Manual", "Glazing Manual", and “Sealant 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."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

F. Heat-Treated Float Glass: Where heat treated float glass is required or indicated provide glass in accordance to ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.

3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

D. Sputtered Coated Low-Emissivity Clear Vision Glass, ASTM C 1376, Kind CV (coated vision glass), coated by sputtered process, ASTM C 1036, Type I, Class I (clear) or Class 2 (tinted) as indicated, Quality-Q3.

E. Pyrolytic Coated Low-Emissivity Clear Vision Glass, ASTM C 1376, Kind CO (coated overhead glass), coated by pyrolytic process, ASTM C 1036, Type I, Class I (clear) or Class 2 as indicated, Quality-Q3.

F. Ceramic-Coated Vision Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."

G. Reflective-Coated Vision Glass: ASTM C 1376.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation

1. Construction: Laminate glass with polyvinyl butyral interlayer or ionoplast interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:

1. Polyvinyl butyral interlayer.

2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.

3. Ionoplast interlayer.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seals.

a. Primary Seal: Polyisobutylene

b. Secondary Seal: Two-part Silicone

2. Spacer: Manufacturer's standard spacer material and construction

a. Color: As select by architect from fabricators full range of colors

2.7 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they 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. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Dow Corning Corporation.
b. GE Construction Sealants; Momentive Performance Materials Inc.
c. May National Associates, Inc.; a subsidiary of Sika Corporation.
d. Pecora Corporation.
e. Sika Corporation.
f. Tremco Incorporated.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. BASF Corporation-Construction Systems.
b. Dow Corning Corporation.
c. GE Construction Sealants; Momentive Performance Materials Inc.
d. May National Associates, Inc.; a subsidiary of Sika Corporation.
e. Pecora Corporation.
f. Polymeric Systems, Inc.
g. Sika Corporation.
h. Tremco Incorporated.

D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Bostik, Inc.
b. Dow Corning Corporation.
c. GE Construction Sealants; Momentive Performance Materials Inc.
d. May National Associates, Inc.; a subsidiary of Sika Corporation.
e. Polymeric Systems, Inc.
f. Schnee-Morehead, Inc., an ITW company.
g. Sika Corporation.
h. Tremco Incorporated.

E. Glazing Sealant: Acid-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. BASF Corporation-Construction Systems.

b. Bostik, Inc.

c. Dow Corning Corporation.

d. GE Construction Sealants; Momentive Performance Materials Inc.

e. May National Associates, Inc.; a subsidiary of Sika Corporation.

f. Pecora Corporation.

g. Polymeric Systems, Inc.

h. Schnee-Morehead, Inc., an ITW company.

i. Sika Corporation.

j. Tremco Incorporated.

F. Glazing Compounds for Fire-rated Glazing Materials

1. Glazing Compound: DAP 33 putty

2. Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S;

3. Grade NS; Class 25 with additional movement capability of 50 percent in both extension

4. and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:

a. Dow Corning 795 - Dow Corning Corp.

b. Silglaze-II 2800 - General Electric Co.

c. Spectrem 2 - Tremco Inc

2.8 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 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not 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 1, for glazing applications in which tape acts as the primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

C. Fire-rated Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

B. Non-Fire Rated Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

C. Fire-rated Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

3.1 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. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. 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.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

G. 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.

3.2 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, then to jambs. Cover horizontal framing joints by applying tapes to jambs, 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. Apply heel bead of elastomeric sealant where indicated.

F. Center glass lites in openings on setting block 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.

G. Apply cap bead of elastomeric sealant over exposed edge of tape where indicated.

3.3 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.

3.4 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.

3.5 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

Protect glass from contact with contaminating substances resulting from construction operations. 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.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

B. Remove and replace glass that is damaged during construction period.

C. Wash glass on both faces not more than 4 days prior to date scheduled for inspection intended to establish date of substantial completion in each area of the project. Wash glass with methods as recommended by glass manufacturer.

3.6 MONOLITHIC GLASS SCHEDULE

A. Clear fully tempered float glass.

1. Minimum Thickness: 6 mm.
2. Visible Light Transmittance: 88 percent minimum.
3. Solar Heat Gain Coefficient: **.84** maximum.
4. Safety glazing required.

B. Glass Type [**GL-2**]: Tinted fully tempered float glass.

1. Basis-of-Design Product: AGC Glass Company North America; Solarshield.

2. Tint Color: Solarshield Pure Grey
3. Minimum Thickness: 6 mm.
4. Visible Light Transmittance: 45 percent minimum.
5. Solar Heat Gain Coefficient: .60 maximum.
6. Safety glazing required.

3.7 INSULATING GLASS SCHEDULE

A. Low-E insulating glass.

1. Basis-of-Design Product: AGC Glass North America; Energy Select 25.
2. Overall Unit Thickness: 1 inch (25 mm).
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Tinted fully tempered float glass.
5. Tint Color: Solarshield Pure Grey, Bronze or Forest Green.
   a. **Color to be selected by Architect after Bid Date.**
6. Interspace Content: Air.
7. Indoor Lite: Clear fully tempered float glass.
8. Low-E Coating: Sputtered on second surface
9. Winter Nighttime U-Factor: .29 maximum.
10. Summer Daytime U-Factor: .27 maximum.
11. Visible Light Transmittance:
    a. Pure Grey -36 percent minimum.
    b. Bronze -39 percent minimum.
    c. Forest Green -48 percent minimum.
12. Solar Heat Gain Coefficient:
    a. Pure Grey -.25 maximum.
    b. Bronze -.27 maximum.
    c. Forest Green -.26 maximum.
13. Safety glazing required.

3.8 INSULATING-LAMINATED-GLASS SCHEDULE

A. Tinted Low-E Large Missile Laminated insulating glass.

1. Basis-of-Design Product: AGC Glass North America; Energy Select 25 Pure Grey.
2. Overall Unit Thickness: 1-5/16 inch (33 mm).
3. Minimum Thickness of Outdoor Lite: 1/4 inch (6 mm).
4. Outdoor Lite: Tinted Fully tempered float glass.
5. Tint Color: Solarshield Pure Grey, Bronze or Forest Green.
   a. **Color to be selected by Architect after Bid Date.**
6. Interspace Content: Air.
7. Indoor Lite: Clear laminated glass with two plies of heat strengthened float glass.
   a. Minimum Thickness of Each Glass Ply: 1/4 inch (6 mm).
   b. Interlayer Thickness: 0.090 inch (2.26 mm) minimum.

8. Low-E Coating: Sputtered on second surface.
9. Winter Nighttime U-Factor: .28 maximum.
10. Summer Daytime U-Factor: .26 maximum.
11. Visible Light Transmittance: 35 percent minimum.
12. Solar Heat Gain Coefficient: .25 maximum.
13. Safety glazing required.
14. Certification: Third party certification required

B. Tinted Low-E Small Missile Laminated insulating glass.
1. Basis-of-Design Product: AGC Glass North America; Energy Select 25 Pure Grey.
2. Overall Unit Thickness: 1-5/16 inch (33 mm).
3. Minimum Thickness of Outdoor Lite: 1/4 inch (6 mm).
4. Outdoor Lite: Tinted Fully tempered float glass.
5. Tint Color: Solarshield Pure Grey, Bronze or Forest Green.
   a. **Color to be selected by Architect after Bid Date.**
6. Interspace Content: Air.
7. Indoor Lite: Clear laminated glass with two plies of heat strengthened float glass.
   a. Minimum Thickness of Each Glass Ply: 1/4 inch (6 mm).
   b. Interlayer Thickness: 0.060 inch (1.52 mm) minimum.
8. Low-E Coating: Sputtered on second surface.
9. Winter Nighttime U-Factor: .28 maximum.
10. Summer Daytime U-Factor: .26 maximum.
11. Visible Light Transmittance: 35 percent minimum.
12. Solar Heat Gain Coefficient: .25 maximum.
13. Safety glazing required.
14. Certification: Third party certification required

END OF SECTION

SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Extent of acoustical ceilings specified in this section include the following:

1. Acoustical lay-in panel ceilings in an exposed suspended metal grid system.

SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

1. Full size sample of each acoustical panel type, pattern and color.
2. Set of 12" long samples of exposed runners and moldings for each color and system type required.

B. Certificates: Submit certificates from manufacturers of acoustical ceiling units and suspension systems attesting that their products comply with specification requirements.

1.3 QUALITY ASSURANCE

A. Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by UL or other testing and inspecting agency accept- able to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.

1. Surface Burning Characteristics: As follows, tested per ASTM E 84.
2. Flame Spread: 25 or less.
3. Smoke Developed: 50 or less.

B. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.

C. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).

D. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.5 PROJECT CONDITIONS

A. Space Enclosures: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete

and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. USG Interiors, LLC. (Basis of Design) | www.usg.com | Ph: 1.800.950.3839
2. Certainteed Corporation | www.certainteed.com | Ph: 1.800.233.8990
3. Armstrong World Industries Inc. | www.armstrongceilings.com | Ph: 877.276.7876

B. Equal products of other manufacturers may be used in the work provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 GENERAL ACOUSTICAL CEILING TILE UNITS

A. Standard for Acoustical Ceiling Tile Units: Provide manufacturer's standard units of configuration indicated which are prepared for mounting method designated and which comply with FS SS-S-118 requirements, including those indicated by reference to type, form, pattern, grade (NRC or NIC' as applicable), light reflectance coefficient (LR), edge detail, and joint detail (if any).

1. Mounting Method for Measuring NRC: No. 7 (mechanically mounted on special metal support), FS SS-S-118; or Type E-400 mounting as per ASTM E 795.

B. Sound Attenuation Performance: Provide acoustical ceiling units with ratings for ceiling sound transmission class (STC) of range indicated as determined according to AMA 1-II "Ceiling Sound Transmission Test by Two-Room Method" with ceilings continuous at partitions and supported by a metal suspension system of type appropriate for ceiling unit of configuration indicated (concealed for tile, exposed for panels).

C. Colors, Textures and Patterns: Provide products to match appearance characteristics indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors, surface textures, and patterns available for acoustical ceiling units and exposed metal suspension system members of quality designated.

2.3 ACOUSTICAL TILES

A. **Acoustical Panel Type: Vinyl Covered Ceiling Panels**

1. USG “Sheetrock Brand Clean Room Lay-In Gypsum Panels”.
2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
    a. Type XX, mineral based with membrane faced overlay. Vinyl face, back and sides covered gypsum ceiling panels.
    b. Form: Not Applicable
    c. Pattern: Smooth
3. Color: Flat White 050.
4. LR: Not less than 0.77
5. NRC: Not less than: N/A
6. CAC: Not less than 35
7. Edge / Joint Detail:
    a. Square (Typical if not indicated on drawings).
    b. SLT Beveled Reveal (Only if indicated on drawings).
8. Panel Thickness: 1/2 inch (12.7 mm).

9. Modular Size: 24 by 24 inches (610 by 610 mm).
10. Recycled Content: 80%.
11. Panel Features: Washable, scrubbable, soil and impact resistant finish. Meets USDA/FSIS guidelines for use in food processing areas.
12. Clean room performance: Acceptable in applications up to Class 100 Clean rooms.
13. ClimaPlus™ 30 year limited system warranty. Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.
14. Suspension Grid/Width: USG Donn ZXLA; 15/16”.

B. **Acoustical Panel Type: Lay-In Acoustical Ceiling Panels**

1. USG “Radar” Acoustical Panels
2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
    a. Type III, mineral base with painted finish
    b. Form: 2, water felted.
    c. Pattern: Perforated, small holes and light texture.
3. Color: Flat White 050.
4. LR: Not less than 0.84
5. NRC: Not less than 0.45
6. CAC: Not less than 33
7. Edge / Joint Detail:
    a. SQ Square (Typical if not indicated on drawings).
    b. SLT Beveled Reveal (Only if indicated on drawings).
8. Panel Thickness: 5/8 inch (15.8mm).
9. Modular Size: 24 by 24 inches (600 by 600 mm).
10. Recycled Content: Up to 59%.
11. Panel Features:
    a. Biobased product that is USDA certified.
    b. Abuse Resistant, high durability and can be cleaned easily with a soft brush & vacummed.
12. ClimaPlus™ 30 year limited system warranty. Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.
13. Suspension Grid/Width: USG Donn DX; 15/16” (24mm).

2.4 GENERAL METAL SUSPENSION SYSTEMS

A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable STM C 635 requirements.

B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.

1. White.

C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.

D. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3- times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gage.

E. Edge Moldings and Trim: Formed steel section; exposed surfaces prefinished to match suspension system components.

1. Provide shadow molding for edges equal to MS174; 9/16” thick exposed flange; 3/8” x 3/8” reveal; 7/8” vertical flange.

2. At penetrations of ceiling install manufacturer's standard molding which fits with type of edge detail and suspension system indicated.

3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

F. Hold-Down/Impact Clips: Where indicated provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels. Install hold down clips at all ceiling panels within 10’-0” of and exterior door.

2.5 METAL SUSPENSION SYSTEMS

A. **USG Donn Brand ZXLA 15/16” Acoustical Suspension System**

1. Double-web design; Intermediate Duty as defined by ASTM C635. Bottom face with 15/16” (24mm) exposed flange with pre-painted aluminum cap; cross tee holes and hanger wire holes at 6 in oc; integral reversible splices, commercial quality pretreated and painted, exposed surfaces prefinished in manufacturer's enhanced corrosion resistant polyester paint finish. Cross tees; roll-formed into double-web design with rectangular bulb; 15/16 (24mm) in exposed flange with pre-painted aluminum cap; Stainless Steel clips clenched to the web Main tees and cross tees shall be positively locked yet shall be removable without the use of tools.

2. Structural Classification: Intermediate Duty.

3. Tee Profile: 15/16” (24mm) wide.

4. Color: White

2.6 SEALANT

A. Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.

B. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. BA-98; Pecora Corp.

2. Tremco Acoustical Sealant; Tremco

3. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to schedule bid opening.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.

1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Coordinate ceiling layout with lighting layout. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.2 INSTALLATION

A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to work.

B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.

C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members.

1. Locate hangers within 6" inches from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" n 12'-0".

2. Locate hangers on all 4 corners of the ceiling grid where a projector is installed

D. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperature.

E. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, counter-splaying or other equally effective means.

F. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.

G. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.

H. Screw-attached moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.

I. Install acoustical panels in coordination with suspension system with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

J. Install hold-down clips on panels, within 10’-0”' of exterior door openings, where panels are other than horizontal, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.3 EXTRA STOCK

A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.

1. Ceiling Tile: Furnish not less than one box for each type, color, pattern and size installed.

END OF SECTION

SECTION 09650 - RUBBER BASE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Extent of rubber base is shown on drawings and in schedules.

1.2 QUALITY ASSURANCE

A. Manufacturer: Provide each type of rubber base as produced by a single manufacturer, including recommended, adhesives.

1. Wherever possible, provide required rubber base produced by a single manufacturer.

1.3 SUBMITTALS

A. Product Data: Submit 2 copies of manufacturer's technical data and installation instructions for each type of rubber base.

B. Samples: Submit, for verification purposes, samples of each type, color, and pattern of rubber base,

1.4 JOB CONDITIONS

A. Maintain minimum temperature of 65°F in spaces to receive rubber base for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store rubber base materials in spaces where they will be installed for at least 48 hours before beginning installation. Subsequently, maintain minimum temperature of 55°F in areas where work is completed.

B. Install after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Armstrong World Industries, Inc.
2. Flexco
3. Roppe Corporation

B. Equal products of other manufacturers may be used in the work provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. Colors and Patterns: As selected by Architect from manufacturer's standards.

B. Wall Base: Provide rubber base complying with FS SS-W-40, Type II, with matching end stops and pre-formed or molded corner units and as follows:

1. Height: 4"
2. Thickness: 1/8"
3. Style: Standard Top-Set Cove
4. Finish: Matte

PART 3 - EXECUTION

3.1 INSTALLATION

A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed

corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

B. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.2 CLEANING AND PROTECTION

A. Remove any excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Protect installed flooring with heavy Kraft paper or other covering.

B. Finishing: After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories.

C. Apply polish and buff, with type of polish, number of coats, and buffing procedures in compliance with flooring manufacturer's instructions.

END OF SECTION

SECTION 09672 - RESINOUS FLOORING (EPOXY)

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Decorative Resinous Flooring System consisting of 100% solids epoxy body coats with decorative quartz broadcasts, finished with a durable urethane topcoat ensuring excellent wear and chemical resistance all producing a seamless floor and integral cove base.

B. Related Requirements:

1. Section 07900 "Joint Sealants" for sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

C. Product Schedule: For resinous flooring. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS - N/A

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, 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. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 48-inch- square floor area selected by Architect.

a. Include 48-inch length of integral cove base with inside corner.

2. Simulate finished lighting conditions for Architect's review of mockups.

3. 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 in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Dur A Flex: Dur A Quartz (Basis-of-Design Product); 95 Goodwin Street, East Hartford, CT, 06108; Ph.: 877.251.5418: www.dur-a-flex.com.

B. Subject to compliance with requirements or comparable product by one of the following:

1. American Hi-Tech Flooring Company.
2. BASF Construction Chemicals, Inc.; BASF Building Systems.
3. ChemMasters.
4. Crossfield Products Corp.; Dex-O-Tex.
5. DUDICK Inc.
6. Epoxy Systems, Inc.
7. Key Resin Company.
8. NEOGARD; Division of JONES-BLAIR.
9. Nox-Crete Products Group.
10. Pacific Polymers, Inc.
11. POLY-CARB, Inc.
12. Polymerica, Incorporated.
13. PPG Industries, Inc.
14. Sherwin-Williams Company; General Polymers.
15. Stonhard, Inc.
16. Tamms Industries, Inc.; a division of The Euclid Chemical Company.
17. Tnemec Company, Inc.

2.2 MATERIALS

A. VOC Content of Liquid-Applied Flooring Components: Not more than 100 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

2.3 DECORATIVE RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, decorative- aggregate-filled, epoxy-resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. System Characteristics:

1. Color and Pattern: As selected by Architect from manufacturer's full range after Bid Date.
2. Wearing Surface: Manufacturer's standard wearing surface.
3. Overall System Thickness: 1/4 inch.

C. Body Coats:

1. Resin: Epoxy.
2. Formulation Description: 100 percent solids.
3. Application Method: Self-leveling slurry with broadcast aggregates.

a. Thickness of Coats: 1/16 inch.

b. Number of Coats: Two.

4. Aggregates: Manufacturer's standard.

D. Topcoat: Sealing or finish coats.

1. Resin: Epoxy.

2. Formulation Description: 100 percent solids.

3. Type: Clear.

4. Finish: Matte.

5. Number of Coats: Two.

2.4 ACCESSORIES

A. Primer: Type recommended by manufacturer for substrate and body coats indicated.

1. Formulation Description: 100 percent solids.

B. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.

1. Formulation Description: 100 percent solids.

a. Provide fiberglass scrim embedded in reinforcing membrane.

C. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

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, 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. Roughen concrete substrates as follows:

a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.

b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.

b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after

substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

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, comply with resinous flooring manufacturer's written instructions.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply waterproofing membrane, where indicated, in manufacturer's recommended thickness.

1. Apply waterproofing membrane to integral cove base substrates.

2. Apply waterproofing membrane to flooring substrates

D. Apply reinforcing membrane to substrate cracks.

E. 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 topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: 6 inches high.

F. Apply self-leveling slurry body coats in thickness indicated for flooring system.

1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

G. Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, remove trowel marks and roughness using method recommended by manufacturer.

H. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.

I. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of painting work is indicated on drawings and schedules, and as herein specified including accent painting.

B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.

1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatments specified under other sections of work.

C. Work includes field painting of exposed bare and covered pipes, conduits and ducts (including color coding), and of hangers, exposed steel and iron work, and conduits and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

E. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

F. Following categories of work are not included as part of field-applied finish work.

1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, elevator entrance doors and frames, elevator equipment, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.

3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.

4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.

G. Following categories of work are included under other sections of these specifications.

1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.

2. Unless otherwise specified, shop priming of fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.

H. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.

B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

B. Samples: Prior to beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's re- view of color and texture only.

C. Provide a listing of material and application for each coat of each finish sample. Provide a 4' x 4' sample application of each color paint for Architect's approval prior to final ordering of product. Sample application shall be applied in an inconspicuous place, satisfactory to the Architect.

1.5 DELIVERY AND STORAGE

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Color name and number.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 JOB CONDITIONS

A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degree F and 90 degrees F, unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degree F and 95 degree F, unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85% or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers are listed as acceptable substitutions to the establish minimum standards. Sherwin Williams Products are listed as the standard of product performance and quality.

1. Sherwin Williams Paint Company (SW)
2. Benjamin Moore and Co. (Moore).
3. Pittsburgh Paints (PPG).

B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

1. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

2. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.

3. Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Architect. Furnish material data and manufacturer's certificate of performance to Architect for any proposed substitutions.

B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

PART 3 – EXECUTION

3.1 INSPECTION

A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator. If work is begun before satisfactory conditions are met, then it shall be the Applicators' responsibility for the finish surfaces conditions.

B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.

1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

B. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

2. Clean concrete floor surfaces schedules to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid and allow to dry before painting.

C. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

2. When transparent finish is required, use spar varnish for backpriming.

3. Backprime all exposed exterior wood. Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.

4. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

D. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

1. Touch-up shop-applied prime coats wherever damaged or bare. Clean and touch-up with same type shop primer.

E. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. If film exists, remove film and strain paint material.

3.4 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.

1. Provide finish coats which are compatible with prime paints used.

2. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness not less than specified thickness.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

5. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

6. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

7. Sand lightly between each succeeding enamel or varnish coat.

8. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient time between successive coatings 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 application of another coat of paint does not cause lifting or loss adhesion of the undercoat.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

D. Prime Coats: Apply prime coat where required to be painted or finished, and which has not been primed coated by others.

1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in
first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

E. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

F. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats, unless otherwise indicated.

G. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 FIELD QUALITY CONTROL

A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:

1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.

2. Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

B. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

3.6 CLEAN-UP AND PROTECTION

A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each day.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

D. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.7 EXTRA STOCK

A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.

1. Paint: Furnish not less than one gallon for each type and color, applied.

3.8 EXTERIOR PAINT SCHEDULE

A. Paint all new and old roof penetrations at roof areas, including roof attic ventilators and exhaust fan housings.

B. General: Provide the following paint systems for the various substrates, as indicated.

C. Ferrous Metals: Gloss Alkyd Enamel: 2 Finish coats over primer with total dry film thickness of not less than 6.0 mils.

1st Coat:	S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat:	S-W Industrial Enamel, B54 Series
3rd Coat:	S-W Industrial Enamel, B54 Series, (2-4 mils dry per coat)

Optional System:

1st Coat:	S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat:	S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series
3rd Coat:	S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series, (1.4 – 1.7 mils dry per coat)

D. Zinc-Coated Metal: Gloss Alkyd Enamel: 2 Finish coats over primer with total dry film thickness of not less than 2.5 mils.

1st Coat:	S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat:	S-W Industrial Enamel, B54 Series
3rd Coat:	S-W Industrial Enamel, B54 Series, (2-4 mils dry per coat)

Optional System:

1st Coat:	S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)

2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss,B53 Series
3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series, (2-4 mils dry per coat)

E. Painted Wood: Gloss Acrylic: 2 finish coats over primer with total dry film thickness of not less than 5.0 mils. Back prime all trim.

1st Coat: S-W Exterior Oil-Based Wood Primer, Y24W08020 (4 mils wet, 2.2 mils dry)
2nd Coat: S-W SuperPaint Exterior Latex Gloss Paint, A84 Series
3rd Coat: S-W SuperPaint Exterior Latex Gloss Paint, A84 Series (4 mils wet, 1.5 mils dry per coat)

F. Stained Woodwork: Stained Finish: 2 Coats of stain on open grain wood.

1st Coat: S-W Woodscapes Exterior Acrylic Solid Color Stain, (200-400 sq ft/gal) @ 4-8 mills wet; 1.3-2.6 mils dry.
2nd Coat: S-W Woodscapes Exterior Acrylic Solid Color Stain, (200-400 sq ft/gal) @ 4-8 mills wet; 1.3-2.6 mils dry.

G. Masonry Surfaces (pre-cast, poured in place, etc)

1st Coat: S-W Loxon Concrete & Masonry Primer / Sealer, LX02W0050 (5.3 – 8.0 mils wet, 2.1 – 3.2 mils dry per coat)
2nd Coat: S-W Loxon Self-Cleaning Acrylic Coating, LX13 Series
3rd Coat: S-W Loxon Self-Cleaning Acrylic Coating, LX13 Series (5.0 – 7.0 mils wet, 2.1 – 2.9 mils dry per coat)

H. CMU (Concrete Masonry Units):

1st Coat: S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat)
2nd Coat: S-W Loxon Self-Cleaning Acrylic Coating, LX13 Series
3rd Coat: S-W Loxon Self-Cleaning Acrylic Coating, LX13 Series (5.0 – 7.0 mils wet, 2.1 – 2.9 mils dry per coat)

3.9 INTERIOR PAINT SCHEDULE

A. General: Provide the following paint systems for the various substrates, as indicated on drawings, schedules and specifications.

B. Paint all exposed metals (steel framing, mechanical ducts, conduit, etc.) unless otherwise indicated on drawings.

C. Painter shall identify all fire and smoke partitions above lay in ceilings as follows: Wording shall be “FIRE AND SMOKE BARRIERS - PROTECT ALL OPENINGS” (4” high), to be applied every 8’- 0” o.c.

D. Pre-Engineered Metal Building/Structural Steel Building Components: Epoxy Eg-Shel Finish: 2 coats over primer with total dry film thickness not less than 6.0 mils. (All Steel/Metal At Interior of Building)

1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66W01310 (5 – 10 mils wet, 1.9 – 3.8 mils dry per coat)
2nd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat)
3rd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat)

E. Concrete Masonry Units: **Latex** Semi-Gloss Enamel Finish: 2 Finish coats over filled surface with total dry film thickness of not less than 11.4 mils.

1st Coat:	S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat)
2nd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series
3rd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat)

F. Concrete Masonry Units: **Epoxy** Semi-Gloss Finish: 2 Finish coats over filled surface with total dry film thickness of not less than 11.4 mils.

1st Coat:	S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat)
2nd Coat:	S-W Pro Industrial® Pre Catalyzed Water-based Epoxy Semi-Gloss, K46-01151 Series (4 mils wet, 1.4 mils dry per coat)
3rd Coat:	S-W Pro Industrial® Pre Catalyzed Water-based Epoxy Semi-Gloss, K46-01151 Series (4 mils wet, 1.4 mils dry per coat)

G. Existing Concrete Masonry Units:

1. If existing material is covered with an enamel finished paint, the following shall be used:

1st Coat:	S-W Extreme Bond Primer, B51W00150 (3.1 mils wet, .9 mils dry)
2nd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series
3rd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat)

2. If the existing concrete block walls are covered in a latex paint, the following shall be used:

1st Coat:	S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)
2nd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series
3rd Coat:	S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat

H. Epoxy Walls (CMU Walls): 2 coats over filler with total dry film thickness not less than 14.0 mils. (Showers Areas)

1st Coat:	S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat)
2nd Coat:	S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series
3rd Coat:	S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish,B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat)

I. Epoxy Walls - Sheetrock: 2 coats over filler with total dry film thickness not less than 14.0 mils. (Showers Areas – NOT in Shower bays)

1st Coat:	S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)

2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy Finish, K45-01151 EgShel
3rd Coat: S-W Waterbased Catalyzed Epoxy Finish, K45-01151 EgShel (2-4 mils dry per coat)

Optional System:
1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)
2nd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish,B73-360 Series
3rd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat)

J. Drywall Walls and Ceilings: Interior Semi-Gloss Finish Acrylic Latex, 3 Coat system with dry film thickness not less than 3.8 mils.

1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series
3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series (4 mils wet, 1.5 mils dry per coat)

K. Zinc-Coated Metal: Alkyd Gloss Finish: 2 Coats over primer, with total dry film thickness not less than 6.0 mils.

1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat: S-W Industrial Enamel, B54 Series
3rd Coat: S-W Industrial Enamel, B54 Series, (2-4 mils dry per coat)

Optional System:
1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series
3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series, (1.4 – 1.7 mils dry per coat)

L. Ferrous Metal: Alkyd Gloss Enamel Finish: 2 Finish Coats over primer, with total dry film thickness not less than 6.0 mils.

1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat: S-W Industrial Enamel, B54 Series
3rd Coat: S-W Industrial Enamel, B54 Series, (2-4 mils dry per coat)

Optional System:
1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat)
2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series
3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss, B53 Series, (1.4 – 1.7 mils dry per coat)

M. Wood Doors & Trim: Interior Semi-Gloss Acrylic Latex with dry film thickness not less than 3.8 mils.

1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600

(4 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series
3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series (4 mils wet, 1.5 mils dry per coat)

N. Stained Woodwork: Stained Varnish Rubbed Finish: 3 Finish Coats over stain plus filler on open grain wood.

1st Coat: S-W MinWax Performance Series Tintable Interior Stain 550 VOC, (450-550 sq ft/gal) Available in 250 VOC Version
2nd Coat: S-W MinWax Performance Series Fast-Dry Varnish,
3rd Coat: S-W MinWax Performance Series Fast-Dry Varnish (600-700 sq ft/gal) (available in Gloss, Semi-Gloss, Satin)

O. Wall Panels: (Acoustical and Wood): Interior Semi-Gloss Finish Acrylic Latex with dry film thickness not less than 3.8 mils.

1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)
2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series
3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series (4 mils wet, 1.5 mils dry per coat)

END OF SECTION

SECTION 10100 - MARKABLE BOARDS AND TACKBOARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of markable boards (M.B.) and tackboards (T.B.) is shown on drawings.

B. Types of markable boards and tackboards specified in this section include the following:

1. Markable Boards
2. Vinyl Fabric-Faced Cork Tackboards

1.3 QUALITY ASSURANCE

A. Manufacturer: Unless otherwise acceptable to Architect, furnish all markable boards and tackboards by one manufacturer for entire project.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.

B. Samples: Submit full range of color samples for each type of markable board, tackboard, trim and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members for color verification after selections have been made.

C. Shop Drawings: Submit for each type of markable board and tackboard. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.

1.5 SPECIAL PROJECT WARRANTY

A. Warranty on Porcelain Enamel Markable Boards: Provide written warranty, signed by manufacturer, agreeing to replace, within warranty period, porcelain enamel remarkable boards which do not retain original writing and erasing qualities, defined to include surfaces which become slick and shiny, or exhibit crazing, cracking or flaking; provided manufacturer's instructions for handling, installing, protecting and maintaining markable boards have been adhered to during the warranty period. Replacement is limited to material replacement only and does not include labor for removal and reinstallation.

1. Warranty Period: 50 years from date of substantial completion or lifetime of the building.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

B. Manufacturers of Markable Boards and Tackboards:

1. Claridge Products and Equipment, Inc.; www.claridgeproducts.com; 601 Highway 62-65 South, P.O. Box 910, Harrison, AR. 72602-0910; Phone: 800.434.4610 or 870.743.2200.
2. Corona Group, Inc.; www.coronagroupinc.com; 3650 Messer Airport Hwy, Birmingham, AL 35222; Ph.: 205.941.1942.
3. ASI Visual Display Products; www.asi-visualdisplayproducts.com; 2210 Dunwin Drive, Mississauga, ON L5L 1C7, Canada; Ph.: 833.632.0878.
4. PolyVision, Inc.; www.polyvision.com; 10700 Abbotts Bridge Road, Suite 100, Johns Creek, GA. 30097; Phone: 888.325.6351 or 678.542.3100.

5. Marsh Industries, Inc.; www.marsh-ind.com; 2301 East High Avenue, New Philadelphia, OH, 44663; Phone: 800.426.4244.

C. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. Markable Boards (M.B.) - Markable boards shall be porcelain enamel writing surface as manufactured by PolyVision, Inc. Writing surface shall have magnetic properties and perform as follows:

1. As a Writing Surface: The writing surface shall accept various writing medium including but not limited to chalk, pencil, water base marker, ball point pen, and fiber tip pen. All markings shall be clearly visible and easily cleaned.

2. As a Projection Surface: Projected images shall be clearly visible from any angle.

3. Board Construction shall include the following:

a. Facing sheet shall be porcelain enamel (P3 ceramicsteel) fused to 28 gauge steel face at approximately 1500 degrees F. Core shall be 1/2:" particleboard with 0.005" aluminum backing sheet.

b. Provide single piece units up to 4' x 16'. Where overall sizes exceed manufacturer's maximum size, provide two or more panels of equal size as acceptable to the Architect.

B. Tackboards (T.B.): "Fabricork" Vinyl faced fabric (Koroseal) complying with FS CCC-W-408, Type II, mildew resistant, laminated to 1/4" thick cork backing sheet. Furnish materials as required for tack strips.

1. Unless otherwise indicated, make up rigid panels by factory-laminating under pressure to 1/4" thick exterior type plywood or hardboard backing.

2. Color: Color and Pattern to be selected from manufactures standards.

C. Colors and Textures: Color to be selected from manufactures standards.

D. Trim and Accessories:

1. General: Fabricate frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible and keep joints to minimum. Miter corners to neat, hairline closure.

2. Aluminum Finish: Furnish exposed aluminum trim, accessories and fasteners with the following finish:

a. Finish: Manufacturer's standard satin aluminum finish.

3. Chalk-trough: Furnish continuous aluminum chalk-troughs for each markable board, unless otherwise indicated, as follows:

a. Solid extrusion, manufacturer's standard ribbed section, enclosed chalk tray with solid end caps, smoothly curved with concealed mounting.

4. Map-rails and Map hooks: Furnish continuous aluminum maprails with cork tackstrip inserts for each markable board. Provide one pair of paper holders and one pair of maphooks for each 4 foot of remarkable board length. Provide flag holder and 1 pair of roller brackets.

2.3 FABRICATION

A. Assembly: Provide factory-assembled markable board and tackboard units unless field-assembled units indicated.

B. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.

C. Provide manufacturer's standard vertical joint system between abutting sections of markable board.

1. Provide mullion trim at joints between markable board and tackboard.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. **Verify mounting heights with Owner prior to installation.**

B. Deliver factory-built markable board and tackboard units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit at factory, disassembled for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.

C. Install units in locations as shown on drawings and mounted at heights as directed by the Owner, keeping perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories for complete installation.

3.2 ADJUST AND CLEAN:

A. Verify accessories required for each unit properly installed and operating units properly functioning.

B. Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION

SECTION 10200 - LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK:

A. Extent of louvers and vents is indicated on drawings, including indications of sizes and locations.

1. Fixed Wall Louvers.

1.3 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. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

C. Vertical Louver: Louver with vertical blades; i.e., the axes of the blades are vertical.

D. 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.

E. Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets for each product and assembly specified.

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Cleaning methods.

C. Shop Drawings: For units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of elements. Show unit dimensions related to wall openings and adjacent construction; free area for each size indicated for louvers; profiles of frames at jambs, heads, and sills; and anchorage details and locations.

1. Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.

2. For installed products indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Product Certificates:

1. Air Performance: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.

2. Water Penetration: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500 and are licensed to bear the AMCA Certified Ratings Seal in accordance with AMCA Standard 511.

3. Weather Louver Effectiveness: Certificates signed by Air Movement and Control Association International Inc (AMCA) certifying that the manufacturer's stock units are tested in accordance with AMCA Standard 500-L99, Section 8.3.2 - Wind Driven Rain Water Penetration Test, and are licensed to bear the AMCA Certified Ratings Seal in accordance

with AMCA Standard 511.

4. Provide AMCA Certification - Water, Air for louvers as scheduled.

E. 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 owners, and other information specified.

F. Selection Samples: Two complete color charts showing the full range of colors available for units with factory-applied color finishes.

G. Samples for Verification: For each finish specified, two samples representing actual finishes specified; prepared on Samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 years manufacturing similar products. The manufacturer shall have implemented a program for the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.

B. Installer Qualifications: Minimum 2 years experience installing similar louvers.

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

D. Source Limitations: Obtain products through one source from a single manufacturer where alike in one or more respects regarding type, design, or factory-applied color finish.

E. Welding Standards: As follows:

1. Comply with AWS D1.2, "Structural Welding Code - Aluminum."

2. Comply with AWS D1.3, "Structural Welding Code - Sheet Steel."

F. AMCA Standard 500-L: Air performance, water penetration and air leakage ratings shall be determined in accordance with Air Movement and Control Association International Inc (AMCA) Standard 500, "Laboratory Methods of Testing Louvers for Rating."

G. SMACNA Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" recommendations for fabrication, construction details, and installation procedures.

1.6 SEQUENCING AND SCHEDULING

A. Field Measurements: Verify openings and adjacent construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to established dimensions.

2. 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.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Manufacturer shall provide standard limited warranty for louver systems for a period of five years (60 months) from date of installation, no more than 60 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without direct financial cost to the Owner.

B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on extruded 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 10%/ 5 year as determined by Florida test sample.

C. Manufacturer shall provide a 5 year limited warranty for Class I and a 3 year limited warranty for Class II anodized finish on extruded aluminum substrates.

1. Seller warrants the Finish under normal atmospheric conditions.
    a. Will not crack, craze, flake or blister
    b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM method D-2244
    c. Will not chalk in excess of ASTM D-4214-07 number (8) rating, determined by the procedure outlined in ASTMD-4214-07 specification test.
2. Any forming or welding must be done prior to finishing. Post forming or welding will void the warranty.
3. This Warranty applies only if the anodized aluminum product is installed in strict accordance with Seller's recommended practices and maintained in accordance with AAMA (American Architectural Manufacturers Association) publication number 609 and 610-09 ("Cleaning and Maintenance Guide for Architecturally Finished Aluminum").

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers' products have been used to established minimum standards for materials, workmanship and functions:

1. Reliable Architectural Products (Basis of Design) |1300 Enterprise Road, Geneva, Alabama 36340 | PH: 334.684.3621 or 800.624.3914 | www.reliablelouvers.com.
2. Ruskin Company | 3900 Dr. Greaves Rd. Grandview, MO 64030 | PH: 816.761.7476 | www.ruskin.com.
3. The Airolite Company, LLC. | Ph:715.841.8757 | www.airolite.com.
4. Air Performance Louvers LLC. | 159 Genco Drive, Hartford, AL 36344 | Ph: 334.588.0191 or 588.0070 | www.airperformancellc.com.
5. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect not less than Ten (10) days prior to scheduled bid opening.

2.2 STATIONARY BLADE LOUVER

A. Model 4375Z125 as manufactured by Reliable Louver Company

B. Fabrication:

1. Design: Stationary non- drainable louver with drain gutters in head frame with downspouts in the jambs and mullions with all welded construction. Hidden vertical supports to allow unlimited continuous line appearance. Steeply angled integral sill.
2. Frame:
   a. Frame Depth: 4 inches (102 mm).
   b. Wall Thickness: .081 inch (2.1 mm) nominal.
   c. Material: Extruded aluminum, Alloy 6063-T6.
3. Blades:

   Style: Non- Drainable: 37.5 degrees at 5-3/32 inches (129 mm)
   a. Wall Thickness: 0.081 inch (2.1 mm), nominal.
   b. Material: Extruded aluminum, Alloy 6063 T6.
4. Minimum Assembly Size: 12 inches wide by 12 inches high (305 mm x 305 mm).
5. Maximum Factory Assembly Size: Single sections shall not exceed 120 inches wide by 90 inches high (3048 mm x 2286 mm) or 90 inches wide by 120 inches high (2286 mm x 3048). Louvers larger than the maximum single size shall be require field assembly of smaller sections.
6. Recycled Content: 18% post-consumer. 55% pre-consumer, post-industrial, total 73% by weight.

C. Performance Data:
1. Based on testing 48 inch x 48 inch (1,219 mm x 1,219 mm) size unit in accordance with AMCA 500.
2. Free Area: 54 percent, nominal.
3. Free Area Size: 8.58 square feet (0.79 m2).
4. Maximum Recommended Air Flow through Free Area: 803 feet per minute (4.08 m/s).
5. Air Flow: 6890 cubic feet per minute (3.25 m^3/s).
6. Maximum Pressure Drop (Intake): 0.15 inches w.g. (0.035 kPa).
7. Water Penetration: Maximum of 0.01 ounces per square foot (3.1 g/m2) of free area at an air flow of 803 feet per minute (4.08 m/s) free area velocity when tested for 15 minutes.

D. Design Windload: Per Code.

E. Louvers shall be factory engineered to withstand the specified seismic loads.
1. Minimum design loads shall be calculated to comply with ASCE – 7, or local requirements of Authority Having Jurisdiction (AHJ).

2.3 ACCESSORIES

A. Bird Screen: Install insect screens on intake louvers and bird screens on exhaust louvers. Do not install insect screens on HVAC intake louvers.
1. Aluminum: Aluminum, 5/8 inches by 0.040 inch (16 mm by 1 mm), expanded and flattened.
2. Frame: Removable. Re-wireable.

B. Insect Screens: Install insect screens on intake louvers and bird screens on exhaust louvers. Do not install insect screens on HVAC intake louvers.
1. Aluminum: 18-16 mesh, mill finish, .011 inch (0.3 mm) wire.
2. Frame: Aluminum.

C. Extended Sills:
1. Extruded aluminum, Alloy 6063-T6. Minimum nominal thickness 0.060 inch (1.5 mm).

2. Formed aluminum, Alloy 3003. Minimum nominal thickness 0.081 inch (2.1 mm).

D. Visible Mullions: Manufacturer's standard horizontal or vertical visible mullions for architectural accent as indicated on drawings.

2.4 FINISHES

A. Finish: 70 percent PVDF: Finish shall be applied at 1.2 mil total dry film thickness.

1. Coating shall conform to AAMA 2605. Apply coating following cleaning and pretreatment. Cleaning: AA-C12C42R1X.

a. Standard 2-coat.

2. 20-year finish warranty.

B. Color: Color to be selected by Architect.

2.5 MATERIALS, GENERAL

A. Fastenings: Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be hot-dip galvanized, stainless steel or aluminum. Provide types, gages and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

B. Anchors and Inserts: Use metal anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required.

C. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.6 FABRICATION, GENERAL

A. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage where applicable (for adjustable units, if any); strength; durability; and uniform appearance.

B. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.

C. Include supports, anchorages, and accessories required for complete assembly.

D. Provide sill extensions and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.

E. Maintain equal blade spacing, including separation between blades and frames at head and sill to produce uniform appearance.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Prepare substrates and openings using methods recommended by manufacturer for achieving best result for substrates under project conditions.

B. Do not proceed with installation until substrates and nailers have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

1. Locate and place units level, plumb, and at indicated alignment with adjacent work.

2. 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.

3. Form closely fitted joints with exposed connections accurately located and secured.
4. Provide perimeter reveals and openings of uniform width for sealants and joint fillers as indicated on Drawings.
5. 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.
6. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

B. Install concealed gaskets, flashings, joint fillers, and insulation, as installation progresses, where weathertight joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during installation.

3.3 ADJUSTING, CLEANING AND PROTECTION

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Protect products from damage until completion of project. Use temporary protective coverings where needed and approved by manufacturer. Remove protective covering at the time of Substantial Completion.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10410 - IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Types of identifying devices specified in this section include the following:

1. Room Signs (See Door Schedule)

B. Note to the Contractor: If the Contract Sum (as awarded) is $100,000.00 or more, the Contractor shall furnish and erect a project sign and interior plaques as shown in “Detail of Project Sign” (DCM Form C-15) and “Plaque Detail” bound in the Project Manual at the end of “General Conditions”. The project sign shall be erected in a prominent location selected by the Architect and Owner and shall be maintained in good condition until completion of Work.

C. Extent of signs and plaque is indicated on the drawings.

1.3 QUALITY ASSURANCE

A. Drawings and Specifications are based on one manufacturer's standard products. Another standard system of a similar and equivalent nature may be acceptable when the differences do not materially detract from the design concept or intended performance as judged solely by the Architect.

B. General Contractor is responsible for verifying signage requirements and correct wording, names etc. with Owner and Architect before ordering.

1.4 SUBMITTALS

A. Shop Drawings: Submit shop drawings for each type of device. Include large scale sections of typical members and other components. Provide dimensioned elevations. Show anchorages, grounds and reinforcement and indicate finishes.

PART 2 - PRODUCTS

2.1 ROOM SIGNS

A. MANUFACTURER:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.

a. ASI Sign Systems, Inc., 8181 Jetstar Drive, Suite 100, Irving, TX 75063; www.asisignage.com; 1-800-274-7732

b. Best Sign Systems, www.bestsigns.com; 1202 N. Park Avenue, Montrose, CO 81401-3171, Phone (970) 249-2378 or 1-800-235-2378; Fax (970) 249-0223

c. Leeds Architectural Letters of Alabama Inc, www.leedsletters.com; P.O. Box 40, Leeds, AL 35094; Phone (205) 699-5271; Fax (205) 699-3342

d. Bayuk Graphic Systems, Inc., www.bayukgraphics.com; 5005 Old Lincoln Highway Parkesburg, PA 19365; Phone: (717)-442-0274; Fax: (717)-442-1289

e. Mohawk Sign Systems; www.mohawksign.com; 5 Dandreano Dr, Amsterdam, NY 12010; Ph. 518.842.5303.

2. Substitutions: Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS:

1. Provide 6" x 8" high laminated plastic with raised lettering complying with the Americans with Disabilities Act (ADA).
2. All Signs MUST include 1” Slide In Window Slot.
3. Color to be selected by the Architect after bid date from manufacturer standards.
4. Use International Symbols of accessibility for identifying facilities as accessible.
5. Letters and numerals shall be raised 1/32 in (0.8 mm) minimum, upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille.
6. Raised characters shall be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm).
7. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6 in (152 mm) minimum in height.
8. **See Door Schedule. If not shown provide 20 letter characters per room sign.**
9. **The Supplier will be required to meet with the Owner for exact wording for all room signs before preparation of the shop drawing submittal to the Architect for approval.)**
10. Tactile characters on signs shall be located 48 inches (1220 mm) minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches (1525 mm) maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.
    a. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
    b. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf.
    c. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door.
    d. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.
    e. Signs containing tactile characters shall be located so that a clear floor space of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Mounting devices shall be concealed.

2.2 METAL LETTERS

A. MANUFACTURER:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
    a. Impact Architectural Signs, www.impactsigns.com; 26 E. Burlington Avenue, LaGrange, IL 60525: (708) 469-7178; impact@impactsigns.com
    b. Leeds Architectural Letters of Alabama Inc, www.leedsletters.com; P.O. Box 40, Leeds, AL 35094; Phone (205) 699-5271; Fax (205) 699- 3342
    c. Matthews Architectural Products, www.matthewsid.com; 2 North Shore Pittsburgh, PA 15212; (412) 571-5500; (800) 950-1317
    d. A.R.K. Ramos Architectural Signage, www.arkramos.com; 1321 S. Walker Ave., Oklahoma City, OK; Ph. 800.725.7266
2. Substitutions: Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS

1. Provide standard cast aluminum letters for exterior architectural signage shown on drawings and as follows:
2. Building Signage: Provide full size sample prior to manufacture of all letters.
    a. Mounting shall be projected mount without collars set in adhesive.
    b. Color shall be anodized aluminum.
    c. Style of letter shall be as follows:
        I. Height: 15” High - Upper Case.
        II. Depth: 1 ¼” Deep – Upper Case.
        III. Font: Arial Bold
        IV. Letters to read as indicated on drawings.

2.3 PLAQUE

A. MANUFACTURER:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
    a. Impact Architectural Signs, www.impactsigns.com; 26 E. Burlington Avenue, LaGrange, IL 60525: (708) 469-7178; impact@impactsigns.com
    b. Leeds Architectural Letters of Alabama Inc, www.leedsletters.com; P.O. Box 40, Leeds, AL 35094; Phone (205) 699-5271; Fax (205) 699- 3342
    c. Matthews Architectural Products, www.matthewsid.com; 2 North Shore Pittsburgh, PA 15212; (412) 571-5500; (800) 950-1317
    d. A.R.K. Ramos Architectural Signage, www.arkramos.com; 1321 S. Walker Ave., Oklahoma City, OK; Ph. 800.725.7266
2. Substitutions: Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS

1. Refer to *Detail Of Plaque (ABC Form C-16, August 2001)* at the front end of the project manual.
2. Size: 24" high x 30" wide.
3. Cast aluminum with bronze finish of standard alloy, hand tooled and chased.
4. Raised letters and border.
5. Satin finish.
6. Background pebbled finish and oxidized to a darker finish.
7. Casting to be free of pits and holes, square and true with no warping.
8. Border style to be single line.
9. Letters to be flat face classic design.
10. Furnish Rubbing to Architect for approval.

C. Wording on the plaque shall read as follows.

(NAME OF PROJECT)
(CITY NAME), ALABAMA

ERECTED (Year)

STATE OF ALABAMA

THE (NAME) COUNTY BOARD OF EDUCATION
MR. (NAME), PRESIDENT
MRS. (NAME), VICE PRESIDENT
MR. (NAME), BOARD MEMBER
MR. (NAME), BOARD MEMBER
MR. (NAME), BOARD MEMBER
MRS. (NAME), BOARD MEMBER
MRS. (NAME), BOARD MEMBER
DR. (NAME), SUPERINTENDENT

SUPERVISED BY

Alabama Real Property Management, Division of Construction Management

McKEE AND ASSOCIATES ARCHITECTS, INC

(COMPANY NAME), CONTRACTOR

2.4 PROJECT SIGN

A. MATERIALS

1. Refer to *Detail of Project Sign (DCM Form C-15, August 2021)* at the front end of the project manual.

B. Wording on the project sign shall read as follow.

STATE OF ALABAMA

THE (NAME) COUNTY BOARD OF EDUCATION
MR. (NAME), PRESIDENT
MRS. (NAME), VICE PRESIDENT
MR. (NAME), BOARD MEMBER
MR. (NAME), BOARD MEMBER
MR. (NAME), BOARD MEMBER
MRS. (NAME), BOARD MEMBER
MRS. (NAME), BOARD MEMBER
DR. (NAME), SUPERINTENDENT

KAY IVEY, GOVENOR

"Investing in Alabama's Future"

(NAME OF PROJECT)
(CITY NAME), ALABAMA

Alabama Real Property Management, Division of Construction Management

McKEE AND ASSOCIATES ARCHITECTS, INC

(COMPANY NAME), CONTRACTOR

2.5 FABRICATION

A. General: Fabricate signs to comply with requirements indicated including, dimensions, design details, quality, thickness and finish of materials. Use materials and shapes of sufficient thickness, with reinforcing, if needed, to produce sufficient flatness, free of “oil canning”, and to impart sufficient strength for size, design and application indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units plumb and level, in locations and with mounting shown. Securely attach to the supporting structure with concealed fasteners, in accordance with the manufacturer's installation instructions.

3.2 CLEANING AND PROTECTION

A. At completion of the installation, clean surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION

SECTION 10440 - FIRE EXTINGUISHERS AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire Extinguishers.
2. Extinguisher cabinets.
3. Accessories.

B. Related Requirements:

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

1.2 REFERENCES

A. Reference Standards:

1. ASTM International (ASTM):
   a. ASTM E814-11a, Standard Test Method for Fire Tests of Penetration Firestop Systems.

2. International Code Council (ICC):
   a. International Building Code (IBC) - Current Edition.

3. Intertek Testing Services/Warnock-Hersey International (ITS/WHI)

4. National Fire Protection Association (NFPA):
   a. NFPA 10-2010, Standard for Portable Fire Extinguishers: For criteria covering installations for Class A, B, C, D, and K hazards as well as the selection, inspection, maintenance, recharging, and testing of portable fire extinguishing equipment.
   b. NFPA 70-2011, National Electrical Code.

5. Underwriters Laboratories, Inc. (UL)

6. United States Code (USC):
   a. Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008: For restrictions relating to cabinet projections in corridors.

1.3 ACTION SUBMITTALS

A. Submit in accordance with Section 01600:

1. Product Data:

   a. Cabinets: Materials description for fire extinguisher cabinets include roughing-in dimensions, details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, door style and materials.

   b. Extinguishers: Materials description for fire extinguishers; include ratings and classifications.

   c. Installation instructions for each product specified.

2. Shop Drawings:

    a. Small-scale plans showing locations of fire extinguisher cabinets and individual fire extinguishers.

    b. Schedules showing each type of cabinet and extinguisher to ensure proper fit and function.

    c. Indicate installation procedures and accessories required for a complete installation.

3. Samples:

    a. Extinguisher Cabinet Door and Trim Finishes: For each type of exposed finish required, prepared on samples of size indicated below:

        i. Size: 6 inches (150 mm) square.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Comply with standards referenced in Article 1.02 - REFERENCES.

B. Provide fire extinguishers, cabinets and accessories produced by a single manufacturer.

C. Provide fire extinguishers of type approved by UL, State Fire Marshal's Office, and local regulatory agencies, if any.

D. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle fire protection specialties and related materials using means and methods that will prevent damage, deterioration, or loss.

1. Deliver components in manufacturer's original packaging, properly labeled for identification.

1.7 WARRANTY

A. All Fire Protection Products (except fire extinguishers) carry a one year warranty after date of shipment against defects in materials or workmanship. Fire extinguishers carry a longer warranty. We will replace or repair any product found defective within this period. No other warranty expressed or implied is valid. Manufacturer’s warranty, terms and conditions apply in all cases. Please see complete warranty on our website for more details.

PART 2 - PRODUCTS

2.1 FIRE PROTECTION SPECIALTIES MANUFACTURERS

A. Acceptable Manufacturers:

1. J. L. Industries, Inc., a division of Activar Construction Products Group; 9702 Newton Av S Bloomington, MN 55431; (800) 554-6077, (952) 835-6850, (952) 835-2218 (FAX); SALES@ACTIVARCPG.COM; www.activarcpg.com

2. Larsen's Manufacturing Company
3. Modern Metal Products

B. Substitutions: Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 FIRE EXTINGUISHERS

A. Multi-Purpose Chemical Type: Extinguisher unit containing a fluidized and siliconized mono ammonium phosphate powder; nonconductive and nontoxic.

1. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin and upright squeeze grip.

2. Finish: Factory powder-coated; Red.

3. Effectiveness (Rating): Class A, B, and C fires.

4. Model Identification and UL Rating: Cosmic **10E; 4A-80BC**.

5. "Start Up Tags" for each fire extinguisher must be provided and approved by Local Fire Department before Final Inspection.

2.3 EXTINGUISHER CABINETS

A. Cabinet with Steel Trim and Door:

1. **Ambassador Series, Model 1017F10** at Non-Fire Rated Walls.

2. **Ambassador Series, Model 1017F10FX2** at Fire Rated Walls.

B. Cabinet Style: **Semi-recessed**.

1. Tub: Cold-rolled steel.

a. Finish: Factory-applied powder coat paint finish.

i. To be selected by Architect after bid date from manufacturer Standard Colors.

2. Door and Trim Construction: Cold-rolled steel; flush doors with 5/8 inch (15.88 mm) door stop attached by continuous hinge and equipped with zinc-plated handle with roller catch.

a. Finish: Factory-applied powder coat paint finish.

i. To be selected by Architect after bid date from manufacturer Standard Colors.

3. Trim Style and Depth: Cabinets located in corridors shall not protrude into the hall way more than 2 1/2".

a. Semi-Recessed Cabinet:

i. Rolled Edge**:** 2-1/2 inch (63.50 mm).

b. Trim Dimensions: 1-3/4 inch (44.45 mm) face trim on frame and 1-1/4 inch (31.75 mm) face trim on door.

C. Fire-Rating: Provide Fire-Rated cabinets for 1-hour and 2-hour combustible and noncombustible wall systems as required.

2.4 CABINET DOOR STYLES, GLAZING TYPES, AND ADDITIONAL OPTIONS

A. Door Style:

1. Style F: Full glazing; with pull handle.

B. Door Glazing:

1. Type 10: Clear acrylic.

C. Additional Options:

1. Cabinet Lettering:

a. Text: FIRE EXTINGUISHER.

b. Color(s): [Red] [Black] [White]. To be selected by Architect after bid date.

2.5 SOURCE QUALITY CONTROL

A. Ship extinguishers to the Project site fully charged, EXCEPT those which contain water as an extinguishing agent, if any.

B. Obtain Fire Extinguishers and Fire Extinguisher Brackets from same manufacturer to ensure compatibility.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semi-recessed cabinets will be installed and blocking where surface mounted cabinets will be installed.

1. Notify the Contractor in writing of conditions detrimental to proper and timely completion of the installation.

3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install cabinets in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.

1. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.

2. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer=s instructions.

3. Maintain fire ratings where cabinets are recessed into fire-rated wall systems.

B. Cabinet Lettering:

1. Identify fire extinguisher in cabinet with lettering spelling "FIRE EXTINGUISHER" painted on

door by silk screen process. Provide lettering on door as indicated, or if not indicated, as selected by Architect from manufacturer's standard letter sizes, styles, colors and layouts.

3.3 FIELD QUALITY CONTROL

A. Ensure that each extinguisher is fully charged, and that inspection of each extinguisher has been performed, as evidenced by the National Association of Fire Equipment Distributors certification tag, just prior to turnover.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 10500 - LOCKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Products in this section include the following:

1. Furnish and install factory-assembled Heavy-Duty MIG-Welded Metal Lockers, complete, as shown and specified per contract documents.

1.3 RELATED WORK

Section 03310, Cast-In-Place Concrete.

A. Section 06100, Rough Carpentry.

1.4 QUALITY ASSURANCE

A. All lockers shall be factory-assembled, of all MIG welded construction, in multiple column units to meet job conditions. **Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable.** Grind exposed welds and metal edges flush and make safe to touch.

B. MANUFACTURING STANDARD: **Imported Manufactured Lockers will not be accepted.** Provide metal lockers that are standard products of a single manufacturer, with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.

C. FABRICATOR QUALIFICATIONS: **Imported Fabricated Lockers will not be accepted**. Firm experience (minimum 5 years) in successfully producing the type of metal lockers indicated for this project, with sufficient production capacity to produce required units without causing delay in the work.

D. INSTALLER QUALIFICATIONS: Engage an experienced (minimum 2 years) installer who has successfully completed installation of the type of metal lockers and extent to that indicated for this project.

E. Lockers shall be GREENGUARD Children & Schools Certified[SM]

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for metal locker units.

B. Samples: Submit color samples on squares of same metal to be used for fabrication of lockers.

C. Shop Drawings: Submit shop drawings for metal lockers, showing locker types, sizes, quantities, Show lockers in detail, method of installation, fillers, trim, base, and accessories. Include locker numbering sequence information.

1.6 PRODUCT HANDLING

A. GENERAL: All work shall be fabricated in ample time so as to not delay construction process.

B. DELIVERY: All materials shall be delivered to the site at such a time as required for proper coordination of the work. Materials are to be received in the manufacturer's original, unopened packages and shall bear the manufacturer's label.

C. STORAGE: Store all materials in a dry and well ventilated place adequately protected from the elements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following manufacturers' products have been used to established minimum standards for materials, workmanship and functions:

1. List Industries Inc., Superior (Basis of Design); 401 Jim Moran Blvd., Deerfield Beach, Florida 33442; www.listindustries.com; PH: 1.800.776.1342.
2. Penco; 1820 Stonhenge Drive, Greenville, NC 27858; www.pencoproducts.com; PH: 800.562.1000.
3. De Bourgh Manufacturing Co. | 27505 Otero Ave. La Junta, CO 81050 | Ph: 800.328.8829 | www.debourgh.com.
4. Tennsco Corp. | 201 Tennsco Drive, Dickson, TN 37055 | PH: 866.446.8686 | www.tennsco.com.
5. Lyon; 420 N. Main Street, Montgomery, IL 60538; www.lyonworkspace.com.; PH: 800.433.8488.
6. Elite Storage Products; P.O. Box 517, Collierville, TN 38027 | PH: 901.367.3930

2.2 LOCKERS

A. SUPERIOR ALL-STAR MVP SPORT FULLY FRAMED ALL-WELDED LOCKERS

1. Size: 24” W x 24” D x 72” H
2. Materials:
   a. Steel Sheet: All sheet steel used in fabrication shall be prime grade free from scale and imperfections and capable of taking a heavy coat of custom blend powder coat.
   b. Fasteners: Cadmium, zinc or nickel plated steel; bolt heads, slot less type; self-locking nuts or lock washers.
   c. Hardware: Hooks of cadmium plated, zinc plated steel or cast aluminum. Coat rods of stainless steel tube.
   d. Handle: Zinc plated, cold rolled steel finger pull.
   e. Number Plates: To be aluminum with not less than 3/8" high etched numbers attached to door with two aluminum rivets. **NOTE: Prior to placing any orders for Number Plates, the General Contractor is responsible for verifying Locker numbering sequence with the Owner.**
3. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. All lockers shall be factory-assembled, of all MIG welded construction, in multiple column units to meet job conditions. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown locker construction is not acceptable. Grind exposed welds and metal edges flush and make safe to touch.
4. Frame / Vertical Side panels: Shall be of 13 gauge ½” flattened expanded metal framed by 16 gauge Hollow "T" tubular sections and channel frame members designed to enclose all four edges of the side panel with the entire assembly MIG welded to form a rigid frame for each locker. The channel frame members are welded to the front and rear vertical frame members to create and anchor bearing surface of 1-1/4 inches wide x the depth of the locker at each side panel. Note: Diamond perforated sheet steel or 3/4” expanded metal will NOT be accepted.
5. Integral Frame Locker base: 14 gauge formed structural channels are MIG welded to the front and rear vertical side panel frame members to allow placement of locker bottom a minimum 2-3/4" above floor level. Locker bottom shelf located less than 2” above floor level will not be acceptable.

6. Flat Tops: Shall be formed of one piece of 16 gauge cold rolled sheet steel and shall be an integral part MIG welded to each vertical side panel frame member and be continuous to cover the full width of a multiple framed locker unit.
7. Hat Shelf, Intermediate Shelves and Bottoms: Shall be 16 gauge galvanneal sheet-steel, have double bends at front and shall engage slots in the Hollow "T" vertical frame members at all four corners and be securely welded to the frame and side. Locker bottom shelf located

   less than 2” above floor level will not be acceptable.
8. Backs: Shall be 18 gauge cold rolled sheet-steel, be continuous to cover a multiple framed unit and be welded to each vertical side panel frame member.
9. Finishing: All locker parts to be cleaned and coated after fabrication with a seven stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade custom blend powder electrostatically sprayed and baked at 350 degrees Fahrenheit for a minimum of 20 minutes to provide a tough durable finish.
   a. Color to be selected by Architect from manufacturer's standard list of colors. Two-Tone Color Combination (if optional security compartment included): Shall be at no additional cost with the locker body, frame and trim chosen from one color and the doors may be one of any other color chosen from manufacturers standard selection.
10. Include Optional Upper Security Compartment:
    a. Full-Width Upper Security Compartment: Shall be top hinged and be fabricated from single sheet prime 14 gauge with single bend at top and sides with a double bend at latch point (bottom). Door shall be perforated with Security-Plus ventilation. A spring loaded galvanized latch assembly shall be securely welded to the inside of the door. The latch shall be a minimum of 11 gauge, be equipped with a stainless steel spring and shall automatically engage when door is closed. Rubber bumpers shall be riveted to return bends on doors. Locking devise shall be designed for use with both a padlock and built-in lock. Top hinged gym door shall be hinged using a 3/16" diameter continuous hinge rod completely recessed into the door with a concealed fastener. Padlock Strike Plates are required.
11. Include Optional Lower Seat/Shelf:
    a. Lower Seat/Shelf: Shall be 16 gauge galvanneal sheet steel, have double bends at front and shall engage slots in the Hollow "T" vertical frame members at all four corners and be securely welded to the frame and side. A reinforcing bar shall be welded to the inside of the front return bend for added strength.
12. Equipment: Equipment: Furnish each locker with the following items:
    a. Stainless Steel Coat Rod: Furnish each locker with one full locker width coat rod which shall be 1” diameter stainless steel tubing factory attached below upper hat shelf.
    b. Finished End Panels (If required): Shall be "Boxed" type formed from 16 gauge cold rolled steel with 1" O.D. double bends on sides and a single bend at top and bottom with no exposed holes or bolts. If lockers have slope tops, end panels must be formed with slope at top to cover the ends of the slope tops. Finished to match lockers. Provide at all exposed ends.
    c. Continuous Slope Tops: Not less than 18 gauge sheet steel approximately 18 degrees pitch, in lengths as long as practical but not less than four lockers. To be installed in addition to the locker flat top with end closures for support. Finished to match lockers.
    d. Fillers (if required): Provide where indicated of not less than 16 gauge sheet steel, factory fabricated and finished to match lockers.
13. LOCKS:
    a. Not Required.

14. Lifetime Warranty: Lockers shall be covered against all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction and vandalism under this section for the lifetime of the facility.

PART 3 - EXECUTION

3.1 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication of special components, when possible, to ensure proper fitting of work. However, allow for adjustment and fitting of trim and filler panels wherever taking of field measurements before fabrication might delay work.

3.2 INSTALLATION

A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.

B. Space fastenings about 48" o.c., unless otherwise recommended by manufacturer, and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal fasteners insofar as possible.

C. Install trim, and metal filler panels where indicated, using concealed fasteners to provide flush, hairline joints against adjacent surfaces.

3.3 ADJUST AND CLEAN

A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.

B. Touch up marred finishes but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended of furnished by locker manufacturer**.**

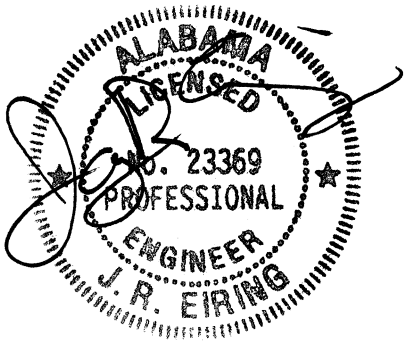
END OF SECTION

New Baseball and Softball Dressing Rooms for
Saraland High School for The
Saraland City Schools
Saraland, Alabama

LATHAN MCKEE PROJECT NO.26-064
ZEA PROJECT NO. 26-119

These specifications sections were prepared by and under the direct supervision of the Engineer of Record for this project.

Division 15 – MECHANICAL
15010 Mechanical General Provisions
15400 Plumbing
15700 Heating, Ventilating & Air Conditioning



July 13, 2026

SECTION 15010

GENERAL MECHANICAL PROVISIONS

PART 1. GENERAL

1.1. **General Requirements:** Bidders and Contractors must treat all Division 15 contract documents with the highest level of care and precision. Thoroughly and completely review all specifications, plans, drawings and related construction documents before submitting a bid or proceeding with work. **Pay special attention to all submittal requirements, as they are strictly enforced**. Incomplete, incorrectly formatted, or improperly submitted submittals will not be accepted and may result in rejection, delays or other ramifications, including potential default or additional costs borne solely by the Contractor.

Bidders must thoroughly review all contract documents during the bidding period. Any missing information, ambiguities, conflicts, discrepancies, or other issues that could affect accurate pricing must be promptly brought to the Architect's attention in writing before the bid due date. This allows all questions to be clarified, and any necessary corrections made prior to bidding. Failure to identify and resolve such issues before submitting a bid will obligate the Contractor to furnish and complete the work, including any disputed or omitted items, using the specified materials and methods, and the Architect and Engineer's requirements, at no additional cost to the Owner or the Owner's Design Professionals, as directed by the Owner's Design Professionals.

Failure to raise such issues in writing prior to bid submission is non-waivable. By submitting a bid, the Contractor accepts full responsibility for furnishing and completing all work, including any disputed, omitted, or conflicting items, using the specified materials, methods and quality standards, at no additional cost to the Owner or the Owner's Design Professionals. The Owner's Design Professionals will direct resolution of any such issues, and the Contractor will have no claim for extra time or compensation.

No materials or products containing asbestos, formaldehyde, polychlorinated biphenyls (PCBs), lead, mercury, or any other hazardous substances are permitted if they exceed the strict limits mandated by OSHA, LEED, EPA, or other applicable regulations. This prohibition is absolute; non-compliance will result in immediate rejection of materials, required removal/replacement at the Contractor's sole expense and potential further penalties.

Only manufacturers and products explicitly named in the specifications may be used without prior approval. Any proposed use of unlisted manufacturers or substitutions requires written approval submitted through the Architect, to the Engineer and must be obtained at least seven (7) calendar days prior to the bid due date, following the exact procedures outlined in Division 1.

When proposing substitutions, the Contractor must include a separate recap/summary sheet at the front of the submittal clearly stating, in writing, all differences (performance, dimensions, features, warranties, etc.) between the proposed item and the specified one. Failure to provide this explicit written disclosure makes the Contractor fully responsible for replacing the substituted item(s) at no cost to the Owner if any discrepancies are later discovered, regardless of prior approval submittal.

The Contractor is solely responsible for securing and paying for all required permits, fees, inspections, utility connections and related costs. No consideration or adjustment will be given after bid opening for any alleged misunderstanding of these requirements, the specifications, plans, utility needs, or associated fees.

Division 1's requirements apply in full to the entire project. Throughout the contract documents (specifications, Codes and Drawings), terms such as "provide," "furnish," "include," or "install" mean the Contractor must furnish, install, connect, test and make fully operational and ready for use the item or system as specified and required, with no exceptions.

All advisory provisions listed in the Codes referenced in the Contract Documents must be considered as mandatory. In the event of any conflict between applicable Codes, Standards, Listings, Contract Drawings or the Contract Specifications and drawings, the most stringent requirement governs. The respective Contractor must provide, install and comply with whichever imposes the strictest requirement, highest standard and the greatest obligation. No exceptions or leniency will be granted. These requirements are intentionally strict to ensure project quality, regulatory compliance, fairness in bidding and protection of the Owner's interests. Non-compliance carries significant risk of financial responsibility, schedule impacts and potential contract default. Bidders and Contractors assume these obligations fully upon participation or award.

1.2. **Buy American:** Manufacturers of all products, materials, equipment, components and systems specified in Division 15 must comply with the Buy American Act and the American Recovery and Reinvestment Act of 2009 (ARRA) and 2025 Code of Alabama Title 39 - Public Works, Chapter 3 - Use of Domestic Products and Resident Workmen for Public Works, Improvements, Etc.

Exceptions to these requirements will be permitted only where the specified items are proven to be unavailable from domestic U.S. sources. Examples of items that may qualify for exception include variable refrigerant flow (VRF) equipment and certain porcelain plumbing products. Any request for exception must be submitted in writing to the Architect/Engineer for prior approval and must include supporting documentation demonstrating that no suitable domestic product is available. Where three (3) or more U.S. manufacturers can furnish products that meet or exceed the requirements of the Contract Documents, only domestic (U.S. manufactured) products must be provided.

During the submittal phase, the respective manufacturer must provide a conformance letter on the manufacturer's official company letterhead. The letter must be signed by an Officer of the Manufacturer's Board of Directors and must explicitly certify full compliance with the Buy American Act and ARRA 2025 Code of Alabama Title 39 - Public Works, Chapter 3 - Use of Domestic Products and Resident Workmen for Public Works, Improvements, Etc. Failure to include this conformance letter with the submittal will result in immediate rejection of the submittal without review.

1.3. **Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.

1.4. **Codes and Standards and Listings:** Unless otherwise specified elsewhere in the Contract Documents, the Contractor must comply with the current editions (as of the date of the Contract) of all publications referenced in these specifications, plus all

applicable federal, state and local codes, standards, ordinances and regulations enforced by the State of Alabama and the authority having jurisdiction (AHJ). In the case of any conflict between the Contract Documents (including Drawings and Specifications) and any applicable codes, standards or regulations, the Contractor must provide and install the Work in accordance with the most stringent requirement. This requirement specifically includes, without limitation, the following (or their most current State-adopted editions/amendments).

Alabama State Building Code (and all companion codes), as the State Building Code and enforced by the Division of Construction Management (DCM), Alabama Department of Finance. The 2021 International Building Code was adopted on July 1, 2022, with exceptions as noted below and amended March 17, 2025, with portions of the 2024 International Building Code and Companion Codes includes the following:

- 2021 – International Existing Building Code
- 2021 – International Plumbing Code
- 2021 – International Fuel Gas Code
- 2021 – International Mechanical Code (with the exceptions listed on the DCM website)
- 2020 – National Electrical Code (NFPA 70)
- 2021 – International Fire Code (with exceptions listed on the DCM website at https://dcm.alabama.gov/bldg_code.aspx.
- ANSI/ASHRAE/IES Standard 90.1 – 2013 (Energy Standard for Buildings except Low-Rise Residential Buildings) with exceptions permitted to 6.5.1-Economizers.
- All locally adopted and enforced building, mechanical, plumbing, gas, fire, electrical and energy Codes of the AHJ (city or county) where the project is located.

All current editions of the Codes and Standards published by the following organizations:

- National Fire Protection Association (NFPA)
- American Society of Mechanical Engineers (ASME)
- Occupational Safety and Health Administration (OSHA)
- International Code Council (ICC) including the International Building Code (IBC), International Energy Conservation Code (IECC), International Fuel Gas Code (IFGC) and International Fire Code (IFC)
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- ASTM International (ASTM)
- American National Standards Institute (ANSI)
- Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
- Americans with Disabilities Act (ADA) and ADA Standards for Accessible Design
- ICC A117.1 — Standard for Accessible and Usable Buildings and Facilities
- U.S. Department of Energy regulations and all other applicable federal requirements
- All applicable local ordinances and codes of the AHJ

All equipment and listed products must bear a label from one of the following Nationally Recognized Testing Laboratories (NRTL):

- Underwriters Laboratories Inc. (UL)
- Canadian Standards Association (CSA)
- ETL (Intertek).

All electrical components and assemblies must also comply with the applicable sections of the Code of Federal Regulations (CFR).

In the event of any conflict between the Contract Drawings, these specifications, or any referenced Code, Standard, or Listing requirement, the most stringent requirement must govern and be provided.

All "advisory" or "recommended" provisions (including any use of the words "should," "may," shall, or similar) appearing in any referenced Code, Standard, or regulation must be interpreted as mandatory ("must").

1.5. **Permits and Inspections:** The Contractor must obtain all permits, licenses and approvals required to perform the Work, pay all associated fees and schedule and coordinate all inspections mandated by the Authority Having Jurisdiction (AHJ), all state and local government inspectors and any other Governing Authorities that may visit or inspect the project site.

The Contractor must submit the original certificates of inspection and approvals issued by all Governing Authorities to the Architect. These certificates and approvals must be incorporated into the Project Closeout Documents for the Plumbing, Fire Protection and HVAC systems.

The Contractor must furnish any additional materials, parts, equipment, methods, or modifications to the Work as required by any Governing Authority's inspections, regulations, or directives.

All deficiencies identified by any Code Official, Governmental Inspector, or other representative of a Governing Authority must be corrected promptly by the Contractor at no additional cost to the Owner or the Owner's Project Design Professionals.

1.6. **Site Visits:** It is the Contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, the Engineer, any governmental agency or any other entity requires a re-inspection with the Engineer present, the Contractor must pay Zgouvas, Eiring & Associates a re-inspection fee of $2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled re-inspection.

Before requesting the final site visit, the General Contractor must provide the Mechanical Engineer and the Architect with a copy of the Mechanical Engineer's above ceiling corrected punch list. The corrected list must be signed and verified by the Mechanical and Plumbing Subcontractors' respective supervisors and the General Contractor to confirm that all items have been resolved. **If any item marked as complete is found to be uncorrected during the final site visit, the site visit will be considered a failure, and a reinspection fee will be imposed.**

The Contractor is urged to carefully review the extensive requirements of Paragraph "Identification" in this Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively,

that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

1.7. **Drawings and Specifications:** The Architect and Engineer will interpret the meaning of the drawings and specifications and will reject all work and materials, which in their judgment, is not in full accordance therewith. Where doubt arises as to the meaning of the plans and specifications, obtain the Architect's decision, in writing, before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.

All drawings are diagrammatic and are intended to quantify the materials specified and indicate their intended relationship with each other. The drawings and specifications are complementary, and work shown, but not specified, or specified, but not shown, must be the same as though required by both.

Bidders must thoroughly review all contract documents during the bidding period. Any missing information, ambiguities, conflicts, discrepancies, or other issues that could affect accurate pricing must be promptly brought to the Architect's attention in writing before the bid due date. This allows all questions to be clarified, and any necessary corrections made prior to bidding. Failure to identify and resolve such issues before submitting a bid will obligate the Contractor to furnish and complete the work, including any disputed or omitted items, using the specified materials and methods, at no additional cost to the Owner or the Owner's Design Professionals, as directed by the Owner's Design Professionals.

Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

DO NOT SCALE the Plumbing and HVAC drawings. In the interest of clearness, the work is not always shown to scale or exact location. Refer to Architectural drawings for dimensions and verify scale shown on the drawings. The various scales used on the drawings do not allow for all fittings, offsets and accessories that may be required to complete the work. Check all measurements, location of pipe, all required and specified appurtenances for duct and piping, ducts and equipment with the architectural and electrical drawings and layout work to fit in with ceiling grids, lighting and other parts. All wiring, piping, ductwork, etc., must be concealed unless specified or noted otherwise. Adjust in the field as required to provide the optimum result to facilitate ease of service, efficient operation and best appearance.

1.8. **Conflicts, Coordination and Changes:** If interferences or conflicts occur, the Architect must decide which equipment must be relocated regardless of which was first installed. In the interest of avoiding such conflicts, each Sub-Contractor who is using common space, etc., must coordinate his work with all other trades and other parts of his own work. If during this coordination, it is discovered that necessary or desirable changes are required to be made, advise the Architect and secure his decision in writing prior to proceeding. Do not fabricate or install any items,

equipment, etc. until all coordination has been accomplished.

Coordinate the location of all Division 15 work with Division 16. Do not run piping, ductwork and similar Division 15 work in NEC dedicated service areas for electrical equipment, including above panel boards, starters, communication panels, control panels, telephone backboards, data panels and similar electrical elements.

1.9. **Coordination Drawings:** The Contractor must comply with all procedures set forth in Division 1. Prior to commencing any work, the Contractor must submit detailed shop drawings for review and coordination. These shop drawings must clearly indicate the proposed arrangement of all equipment, piping, ducts, floor drains, electrical power requirements, equipment maintenance and service access provisions and all associated controls.

As a minimum, the shop drawings must include detailed layouts identifying potential conflicts in areas such as plumbing risers, HVAC ductwork, piping routes, equipment rooms, limited ceiling spaces and any other congested or critical locations. Refer to subsequent specification sections for any additional specific submittal requirements.

The Contractor must fully coordinate the submission of all shop drawings and must promptly refer any questionable or conflicting locations to the Architect/Engineer for resolution prior to any fabrication or installation. Work must not proceed until the shop drawings have been reviewed and accepted by the Architect/Engineer.

Failure to coordinate all items or to correct non-conforming installed work must be performed by the Contractor at no additional cost to the Owner or the Owner's Project Design Professionals.

Failure to submit the required shop drawings must render the Contractor solely responsible for any and all modifications necessary to facilitate the proper installation, maintenance, access and operation of all systems.

1.10. **Maintenance, Replacement and Service Access:** The Contractor must locate all equipment as shown on the Drawings. The Contractor must install all equipment, valves, controllers, actuators, manual dampers, motorized dampers, air vents, cleanouts, smoke detectors, fire dampers, smoke dampers, fans and any other items requiring maintenance, service, or replacement access in strict accordance with the maintenance, service and replacement access requirements specified by the Manufacturer of each respective item. All such items must be installed to provide maximum safety as well as convenient and adequate access for service, replacement and maintenance.

To ensure proper maintenance access, all piping containing valves, all equipment and any other items that may require maintenance, service, or replacement must be located no more than 12 inches above the finished ceiling and no more than 14'-0" above the finished floor in areas without ceilings.

The Contractor must coordinate any questionable access, clearance, or location issues that could conflict with the above requirements with the Engineer or the Architect's field representative prior to installing any item. Failure to perform this coordination will result in any required relocation, modification, or correction being performed by the Contractor at the Contractor's sole expense.

1.11. **Warranty:** Refer to Division 1. Additionally, guarantee in writing to make good

without cost any defects in materials and workmanship for one year following the date of substantial completion of the project as determined by the Architect. Provide free maintenance and service during the guarantee period.

Refer to other Division 15 Sections for additional detailed warranty requirements.

1.12. **Submittal Data:** Within 25 days of contract award, all Contractors must submit a complete submittal for review of **all** specified items proposed including a detailed schedule of materials, means and methods, equipment, etc... Failure to submit any specified items will result in rejection of non-compliant materials, equipment, means and methods, etc. when discovered, with replacement costs borne solely by the Contractor. The Architect and/or Engineer's review of submittals does not absolve the Contractor of full responsibility for strict compliance with all contract documents.

A recap/summary sheet must be inserted at the beginning of each tabbed section to summarize the contents of each respective tabbed section. The recap/summary sheet must include all items that have been changed or removed due to Project cost constraints, addendums, or Value Engineering (VE).

Variations from the specifications, plans and all value engineered (VE) items for the items submitted for review must be explicitly indicated immediately after the submittal cover page otherwise, it will be assumed the product will conform to the plans and specifications in all respects.

Failure to include items changed or removed due to Project cost constraints, addendums or VE items that require an additional review by the Engineer will require the Contractor to reimburse the Engineer a minimum of $700 for the effort involved to review the corrected, proper submittal.

Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found.

Submittals must include catalog data, scheduled capacities, fan curves, sound data, materials and methods of installation, various components of various assemblies, etc.

The General Contractor must review and stamp all submittals prior to submitting them to the Architect. Submittals provided without the General Contractor's review will be automatically rejected and a possible re-review fee of $700 imposed.

Only ONE complete submittal will be accepted for each specification section. Do not submit plumbing fixtures separately without the remaining Section 15400 items submittal. If a partial or incomplete submittal is provided, it will be automatically rejected and a possible re-review fee of $700 imposed. If the Contractor provides a submittal for review and then provides additional items for review after the initial submittal was submitted, a $700 review fee **will** be imposed. The objective is to provide one complete submittal as specified hereinbefore. **Providing submittals piecemeal is not allowed.**

All submittals must be separately bound by specification Section (HVAC and Plumbing) in pdf format. Submittals must be electronically indexed and tabbed. Refer to the Architectural General Conditions and Division 1 for the format required by the

Architect.

A cover sheet must be provided in front of the submittal package which states, as a minimum, the Project name and location, the name of the Owner, the Architectural firm, the Engineering firm, **the Engineer's Project number,** located within the Engineer's logo in the bottom right corner of the HVAC and Plumbing plans and this specification section, the General Contractor, the Mechanical Contractor for mechanical submittals and Plumbing Contractor for plumbing submittals and each Contractors' point of contact, with phone number, as applicable for the respective trade's submittal. The respective Contractor's contact phone number is requested in an effort to obtain submittal clarifications which otherwise may be cause for rejection by the Engineer.

Submittals must include specifications section numbers and related sub-paragraph numbers, materials used, methods of installation, product manufacturer, equipment capacities, etc. HVAC equipment items must follow the identical tabular format, category by category, nomenclature, etc., as shown on the HVAC equipment schedules. As a minimum, the recap/summary sheet must indicate the submitted values compared to each of the specified values. **Failure to provide the submittals in the format specified will be cause for immediate rejection without review.** If there is any doubt as to the format required for the HVAC equipment summary sheet, contact ZEA and an example will be provided. Plumbing must follow the identical procedure specified for the Mechanical Contractor.

1.13. **Submittal Rejection and Resubmittal:** The Contractor must carefully review the submittal data requirements specified above. Pay particular attention to specific items within the specifications that are cause for immediate rejection when submittals are not provided to the Engineer as requested or specified. If the Engineer requests submittals for items not provided and the items are not included in the resubmittal, the resubmittal will be automatically rejected without review and a rereview fee imposed.

When submittals are rejected, **DO NOT** return a copy of the rejected submittal with the Engineer's review stamp or notations. Provide a clean submittal with a recap sheet in the front of the resubmittal addressing each of the Engineer's comments.

Any submittal that requires a review before the Engineer receives a complete submittal, a request for additional submittals, or portions thereof that are rejected TWICE and resubmitted a third, fourth, etc. time for review will require the Contractor to reimburse the Engineer each time for his effort. The minimum fee for each re-review is $700.

1.14. **Site and Existing Conditions:** Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for the alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, etc.

1.15. **Line Locators:** The Contractor must, prior to commencing any excavation, trenching, boring or other subsurface operations, arrange and coordinate with the Owner, all applicable public and private utility companies and a qualified professional line-locating firm to thoroughly identify, describe, mark and locate all existing underground

utilities, piping, conduits, cables, structures and other items that may be impacted by the construction activities. This requirement applies to all work associated with HVAC, plumbing and fire protection systems, including but not limited to water lines, sanitary and storm sewers, gas lines, fire protection mains and services, condensate lines, electrical conduits serving mechanical equipment, communication lines and any other subsurface installations.

The Contractor must obtain accurate utility locations using acceptable methods (paint markings, flags, stakes, or electronic markers as appropriate) and must not proceed with any excavation, trenching, or subsurface work until all utilities have been properly located, field-marked and independently verified by the Contractor. The Contractor must maintain all utility markings in a legible condition throughout the duration of the work and must exercise extreme care to protect all located utilities during construction operations.

Failure to comply with these requirements will render the Contractor solely responsible and liable for all costs associated with any damage incurred, including repair, replacement, restoration, service interruptions, fines, penalties, consequential damages and project delays, at no additional cost to the Owner or the Owner's Project Design Professionals.

1.16. **Phasing:** Interrupt existing services only at times approved by the Architect and the Owner. The General Contractor must make a written request to the Architect and the Owner for permission to interrupt services at the facility. The request must be provided with a minimum of seven (7) days prior to the desired date of the interruption. Hold interruptions to a minimum in duration and frequency.

1.17. **Contractor Requested Electronic Drawing Files:** Not available.

1.18. **Record Documents:** The Contractor must prepare and submit Record Documents in strict accordance with the requirements set forth in the General Conditions and Supplemental Conditions of the Contract and these specifications.

Each Contractor must maintain an accurate and continuous record of all changes made during construction. Prior to commencement of any backfilling operations, the respective Contractor must take precise as-built measurements of all installed work, including all depths, inverts, elevations and locations. It is not acceptable to rely on or reference off-line locations. Definitive, field-verified measurements must be taken for each individual service line, pipe, conduit or underground installation entering and leaving the facility.

The location of all buried piping and underground utilities must be accurately shown on the Record Documents and dimensioned from permanent fixed points (such as building corners, column lines, or other established benchmarks). The Plumbing Contractor and the Fire Protection Contractor must perform the as-built documentation described above for all their respective underground work.

The Plumbing Contractor must clearly indicate on the Record Documents the exact location of all cleanouts, dielectric unions and valve numbers cross-referenced to the specified valve chart.

The respective Contractor must complete the Record Documents by utilizing the As-Built mark-ups maintained in the General Contractor's construction site office. All field changes, deviations and additional information must be transferred onto a complete

set of reproducible copies of the original Contract Drawings.

The final Record Document set must be clearly labeled “Record Documents” in the Title Block of each drawing sheet. The drawings must not contain clouds, revision triangles or any other graphic indications of changes. The Contractor must submit one complete hard-copy set of the corrected reproducible Record Documents to the Architect for final review and incorporation into the Owner’s project records.

Additionally, the Contractor must furnish a complete electronic set of all Record Documents in PDF format on CD-R media (or other Owner-approved digital format). One copy of the CD-R must be included in the Owner’s Operating and Maintenance Manuals as specified in Section 15400 (Plumbing) and Section 15700 (Heating, Ventilating and Air Conditioning). The Contractor is solely responsible for accurately documenting and showing all deviations from the original Contract Drawings. This responsibility includes, but is not limited to, all addenda, change orders, value engineering items, RFI responses, field observations, site visit reports, test results and any other modifications or clarifications that occurred during construction. All such information must be incorporated into the Record Documents by the respective Contractor.

PART 2. MISCELLANEOUS REQUIREMENTS TO BE COORDINATED WITH OTHER TRADES

2.1. **Foundations and Supports: “Sammy” bolts are prohibited.** The Mechanical and Plumbing Contractor, as applicable, must provide foundations, support, etc. not specified under other Divisions and as required to mount all items in a safe, professional and structurally sound manner. The respective Contractor must provide all supplemental steel between various types of structural members, including between bar joists, purloins, wood trusses, miscellaneous structural items, etc. as required for the item(s) proper support. All supports and related components and assemblies must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective item.

Where the Contractor has doubt as to proper supporting requirements, he must consult with and seek the guidance of the Architect and the project Structural Engineer for resolution. Consult all contract documents pertaining to other trades to determine extent of their work.

Concrete pads for outside equipment are specified under other Sections. Concrete work must meet the requirements of Division 3. The respective Contractor must provide all concrete pads not indicated or specified on the Architectural, Civil or Structural plans. Refer to the various equipment specifications for requirements in the absence of requirements by the various disciplines and provide as specified.

2.2. **Pipe Sleeves - General:** All penetrations of interior walls, partitions, floors and similar construction, whether above the ceiling or exposed to view, must be provided with minimum 10-gauge galvanized steel sleeves installed as work progresses and sized to maintain adequate annular space for proper firestopping. PVC or other non-metallic materials are prohibited unless explicitly specified elsewhere.

Copper and other metallic piping must not come into direct contact with concrete or masonry per IPC Section 305.1 and must be continuously protected with a minimum 0.008-inch (8 mil) plastic sheathing that permits free pipe movement.

Every penetration through partitions extending to the structure above must include a complete UL Listed firestop/sleeve assembly in accordance with UL 1479, regardless of partition rating. All non-rated partitions that do not extend to the structure above must utilize 10-gauge galvanized sleeves packed with mineral wool insulation and sealed on both sides with material matching the penetrated assembly, with escutcheons provided in exposed areas. See plan details for additional requirements.

Refrigerant and condensate drainage piping penetrating exterior walls (not through the roof) must use Schedule 40 PVC sleeves 1 inch larger in diameter than the piping plus covering, neatly saw-cut flush, sealed watertight and vermin-proof and painted to match the building exterior. Spray foam is prohibited. See below for requirements of refrigerant and condensate piping penetrations of metal building perimeter penetrations.

All wiring must be installed in conduit (not sleeves) with protective grommets at both ends. Outdoor HVAC control wiring must terminate in conduit above the ceiling in an accessible location. No piping and wiring is allowed to share any sleeve or firestop assembly. Each pipe, conduit, or wire must have its own dedicated sleeve. Split sleeves are prohibited.

2.3. **Pipe Sleeve Assemblies:** Each penetration of a partition that extends to the deck or structure above must include a complete UL Listed firestopping/sleeve assembly, regardless of whether the partition or floor is fire-rated or non-rated. All firestop systems must be UL Listed and labeled in accordance with UL 1479 (Fire Tests of Penetration Firestop Systems) and shall meet the hourly fire-resistance rating required by the applicable code and Contract Documents. When the partition or floor is not assigned a fire rating by the Architect, the minimum firestop assembly requirement must be 1 hour.

2.4. **Exterior Wall Penetrations for Refrigerant and Condensate Piping:** Sleeves for refrigerant piping and condensate drainage piping passing through exterior walls or exterior partitions (but not through the roof) must be Schedule 40 solid wall PVC pipe sized 1 inch larger in diameter than the piping plus its covering. The sleeve must be neatly saw-cut flush with the exterior wall face, filled with mineral wool insulation, then sealed watertight and vermin-proof with silicon sealant and the exposed assembly painted to match the building exterior unless otherwise specified. Spray foam is not an approved sealant. Routing both refrigerant suction and liquid lines through a single sleeve in an exterior wall is acceptable only in this specific instance and then sealed as specified above.

2.5. **Floor and Foundation Penetrations:** All floor sleeves (except in slab-on-grade) must be cast-in-place Schedule 40 steel pipe. Thereafter seal on both sides of the sleeve as specified above.

Any pipe passing through a below-grade foundation wall must be protected by either a relieving arch or a cast-in-place pipe sleeve. The sleeve must be two nominal pipe sizes larger than the pipe it carries (example: an 8-inch sleeve for a 6-inch uninsulated pipe). Piping through foundation walls must be structurally isolated from any loading transferred by the foundation. The annular space between pipe and sleeve must be filled with compatible backing material. The joint between the pipe and concrete or masonry wall must be sealed with a sealant that is compatible with the damp-proofing/waterproofing materials specified in the Architectural sections.

2.6. **Wiring and Conduit Penetrations:** All wiring required to penetrate any exterior wall, interior partition, floor, or similar construction must be installed in conduit (not sleeves), fitted with protective grommets at both conduit ends and subsequently sealed weathertight with silicon sealant.

Outdoor control wiring for HVAC equipment must be installed in conduit to a point above the ceiling in an accessible location, with a grommet installed at the conduit termination to prevent abrasion of the control wiring. Wiring must not be routed through any sleeve or firestop assembly that contains piping. Multiple wires, pipes or other items must not share a single sleeve or firestop assembly. Each conduit, pipe, wire or similar item must be provided its own dedicated assembly as specified.

2.7. **Firestopping:** Provide assemblies to form a specific U.L. or ASTM tested and listed system with minimum 10 ga. sleeve and appropriate UL/ASTM listing that maintains the required or specified integrity of the fire barrier and non-fire barrier to stop the passage of fire, gases, smoke and water. The through penetration firestop systems and firestop devices must be tested and listed in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed or a minimum of 1-hour protection for non-rated assemblies. The assembly or device must prevent passage of fire, smoke, gases and water through openings and prevent transmission of sound and vibration from the penetrating element to the structure. Penetrations involving insulated piping must be a tested and listed firestop system not requiring removal of insulation and in accordance with ASTM E 814 or UL 1479.

Wherever pipes, conduit, ducts, etc. penetrate any type of interior construction that extends to the underside of the structure/deck above it, regardless of whether the wall, partition or floor is a rated assembly or not, the space between the penetrating member and the building construction must be sealed with an ASTM E814 or UL 1479 listed, approved and labeled factory fabricated firestop assembly or device as specified above.

Where partitions are not indicated as fire rated, the firestopping assembly used must provide a minimum of one-hour resistance.

Where walls or partitions do not extend to the structure above, a factory fabricated firestopping assembly is not required. Instead, provide a 16 ga. galvanized sleeve or conduit (for wiring) and pack the respective sleeve or conduit as specified above.

At each through penetration, attach identification labels on both sides, in location where label will be visible to anyone seeking to remove penetrating items or firestopping. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Provide metal labels in areas used as return air plenums. Use metallic mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Additionally, secure to the wall with metal thumbtack at each corner of the label. Labels must be Hilti Firestop Identification Labels 00339611, 3M Sticker 98040056289 or approved equivalent. Firestop identification labels must include the following information on labels:

1. The words: "*Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage*."

2. Contractor's name, address and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

All fire stop material employed on the project must be the same brand throughout. The firestopping assemblies must be manufactured by Hilti, 3M, USG or other pre-approved Manufacturer.

2.8. **Access Panels and Doors:** Do not locate serviceable items above inaccessible, hard ceilings without written approval from the Architect. Coordinate all items' locations with the Architectural ceiling plans before installing any items. Furnish access panels and doors required to the General Contractor for installation for access to valves, controllers, actuators, manual dampers, motorized dampers, air vents, cleanouts, smoke detectors, fire dampers, smoke dampers, fans and any other items requiring maintenance access. Refer to Section 15700, Paragraph Access Doors and Panels for access' required in ductwork.

Doors/panels must be suitable for location and finish involved, 16" x 16" unless otherwise indicated, required or specified to permit removal of equipment and provide acceptable maintenance access.

Access panels and doors must be fire rated where rated assemblies are penetrated. Access panels and doors for items located outdoors or in damp environments must be weatherproof.

Access panels and doors must be manufactured by Milcor, Philip Carey, Zurn, Mifab or approved equivalent. The Architect must approve the use of and type of, panels and doors to be installed in areas that are exposed to view or in finished areas. Exposed access panels and doors must be factory cleaned and primed for painting in the field. Colors, materials and methods must be selected by the Architect. Refer to Architectural Section, Painting, for additional information.

Where device occurs above a lift-out acoustical ceiling panel, provide engraved plastic labels of type specified in Part "Identification Requirements" below.

In addition to identification of items above the ceiling, provide engraved plastic labels below the item, on the ceiling grid. Engraved plastic labels must match ceiling grid size (width), color and be neatly glued to the ceiling grid adjacent to the ceiling tile that should be removed for access to the item. The label must have engraved on it the item being identified and its designation as shown on the plans, valve chart, equipment or item designation, etc. Refer to Part "Identification Requirements" below for additional requirements.

2.9. **Cutting and Patching:** All openings must be laid out. Furnish detailed layout shop drawings to other trades in advance of their work. Failure to furnish layout shop drawings to the General Contractor must make the applicable Mechanical/Plumbing/Fire Protection Contractor responsible to rebuild openings as directed by the Architect. Where openings have not been laid out or built in, or they occur in existing partitions, floors, etc., they must be core drilled or saw cut large enough to allow all penetrating items with or without insulation to continue uninterrupted, with clearances specified.

Piping and duct within walls or behind walls must be installed before wall is erected otherwise, walls, floors, ceilings, etc., affected must be reworked by the trade which erected it at the expense of the respective Contractor. Chasing and cutting new work is not allowed without written permission from the Architect.

2.10. **Duct and Miscellaneous Items Painting and Finishes:** Painting of ducts, piping, piping insulation, grilles, diffusers and other surfaces in finished areas is specified in Architectural Section "Painting" or similar section. Refer to those sections for requirements. If not specified in other sections, paint items with two coats of paint as directed by the Architect. Where the Architectural specifications require items to be painted, the Contractor must furnish it with a Manufacturer provided, factory applied prime coat.

Where factory finished items are marred, scratched, or damaged, replace the item, or upon approval from the Architect or Owner, refinish or touch-up as required or specified to bring to a like new condition.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Also, see Part "Identification Requirements" below for additional requirements.

PART 3. TRENCHING, EXCAVATION & BACKFILLING

3.1. **Excavation:** Keep excavation free from water by pumping if necessary. Ensure that walls and footings and adjacent loadbearing soils are not disturbed in any way, except where lines must cross under a footing. Where a line must pass under a footing, make crossing with the smallest possible trench to accommodate the pipe. Where a line must pass adjacent to and below the bottom of a column footing, or the corner of a continuous footing, backfill the trench with concrete up to the level of the footing bottom, for a distance away from the footing equal to the depth of the fill.

3.2. **Trenching and Bedding of Piping:** Buried piping must be supported throughout its entire length. Where trenches are excavated, such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support must be provided between joints. Bell holes, hub holes and coupling holes must be provided at points where the pipe is joined. Such pipe must not be supported on blocks to grade. In instances where the material manufacturer’s installation instructions are more restrictive than those prescribed by Codes, the material must be installed in accordance with the more restrictive requirement.

3.3. **Over-Excavation:** Where trenches are excavated below the installation level of the pipe such that the bottom of the trench does not form the bed for the pipe, the trench must be backfilled to the installation level of the bottom of the pipe with sand or fine gravel placed in layers not greater than 6 inches in depth. Such backfill must be compacted after each placement.

3.4. **Rock Removal:** Where rock is encountered in trenching, the rock must be removed to not less than 3 inches below the installation level of the bottom of the pipe and the trench must be backfilled to the installation level of the bottom of the pipe with sand tamped in place so as to provide uniform load-bearing support for the pipe between joints. The pipe, including the joints, must not rest on rock at any point.

3.5. **Soft Load-Bearing Materials**: If soft materials of poor load-bearing quality are found at the bottom of the trench, stabilization must be achieved by over excavating not less than two pipe diameters and backfilling to the installation level of the bottom of the pipe with fine gravel, crushed stone or a concrete foundation. The concrete foundation must be bedded with sand tamped into place so as to provide uniform load-bearing support for the pipe between joints.

3.6. **Backfilling:** Backfill within the building and under paved areas must meet compaction requirements established under Division 2. Backfill must be free from discarded construction material and debris. Loose earth free from rocks, broken concrete and frozen chunks must be placed in the trench in 6-inch layers and tamped in place until the crown of the pipe is covered by 12 inches of tamped earth. The backfill under and beside the pipe must be compacted for pipe support. Backfill must be brought up evenly on both sides of the pipe so that the pipe remains aligned. In instances where the manufacturer's instructions for materials are more restrictive than those prescribed by the Codes, the material must be installed in accordance with the more restrictive requirement.

3.7. **Protection of Footings:** Trenching installed parallel to footings and walls must not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane is a line that extends downward, at an angle of 45 degrees from the horizontal, from the outside bottom edge of the footing or wall.

3.8. **Shoring, Sub-Soil Assumptions and Data, Work Around Trees and Surplus Earth:** Refer to Section "Earthwork".

3.9. **Broken Pavement:** In public streets, sidewalks, right of ways, etc., backfill and repair to satisfaction of authorities having jurisdiction.

PART 4. PIPE SUPPORTS, PIPE HANGERS AND MISCELLANEOUS SUPPORTS

4.1. **General:** **Below requirements do not apply to refrigerant piping, nor condensate drain piping.** Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification for refrigerant piping and condensate drainage piping support requirements. Refer to the plan details and these specifications for various piping support requirements.

"Sammy" bolts are prohibited. Provide factory fabricated galvanized pipe hangers and supports for all piping, complete with properly sized bolts, washers, clamps, etc. and with coatings and finishes specified below and all as required for a complete and safely functioning installation. Material items, methods and general requirements not covered in this specification must be provided in strict accordance with current edition of Manufacturer's Standardization Society Specification MSS SP-58 and Manufacturer's Published Product Information.

All hangers, supports, related components and assemblies must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective item. Where the Contractor has doubt as to proper supporting requirements, he must consult with and seek the guidance of, the Architect and the project Structural Engineer for resolution.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts and washers made of copper-coated steel.

Hangers must be manufactured by Elcen Metal Products Co., Fee & Mason Mfg. Co., ITT Grinnell Corp, B-Line Systems or preapproved equivalent.

4.2. **Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts and clamps on Unistrut assemblies are not required to be painted or coated.

All piping, hangers, fittings, etc. must be clean and rust free when it is installed. Before installation, it must be checked, upended and swabbed. All rust or dirt from materials in storage or from lying on the ground must be removed. Any dirty piping installed must be cleaned. Any rusted piping must have the rust removed, etched and primed for painting as recommended by the respective piping manufacturer and then painted with two coats of black, compatible, rustproof enamel paint. Do not use spray paint. The paint must comply with the requirements of ASTM E84 for flame spread and smoke development.

All damaged or rusted steel pipe and fittings, all roof drains, all uncoated cast iron pipe and all hangers, Unistrut and other support assemblies, must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See Part "Identification Requirements" below for additional requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

4.3. **Hangers at Typical Single Suspended Horizontal Pipe:** Where multiple pipes are shown adjacent to each other on the plans, provide a Unistrut assembly as shown on the plan details. Do not use multiple, single pipe assemblies.

Single pipe assemblies must be galvanized adjustable clevis or split-ring type equal to MSS 58 and 59, Type 1. Refer to Coatings and Finishes above for additional requirements. See other specifications and plan details for additional requirements. See part “Hanger Rods” below for limitations on use of clevis hangers.

Do not use clevis hangers for refrigerant piping. See refrigerant piping support requirements in Section 15700, Refrigerant Piping and Accessories.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts and washers made of copper-coated steel.

4.4. **Manifolds and Parallel Runs:** Where multiple pipes are shown adjacent to each other on the plans, provide a Unistrut assembly as shown on the plan details. Do not

use multiple, single pipe assemblies.

As specified above, the Contractor must provide a Unistrut system complete with fittings, clamps and accessories required and specified. Horizontal and vertical mounted piping must all be secured to each Unistrut hanger assembly. Refer to the plan details and specifications for requirements.

Refer to Coatings and Finishes above for additional requirements. Refer to “Hanger Rods” below for locations that require a Unistrut assembly. Furnish for review proposed system components.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts and washers made of copper-coated steel.

Unistrut assemblies must also be provided for refrigerant piping. Refer to Section 15700, Refrigerant Piping and Accessories for requirements.

4.5. **Spacing:** Install supports as required or specified to prevent sags, bends or vibration. Provide additional building supports and attachments where support is required or specified for additional concentrated loads, including valves, in-line pumps, flange guides, strainers, expansion joints and at all changes in direction of piping.

At no-hub pipe, support as specified below for cast iron piping.

In all cases, provide on all sides of and within 12 inches of, all elbows, take-off fittings, joints, valves, any change in direction of item supported, at ends of branches over 5 feet long and on centers not exceeding the following:

Piping Material	Pipe Size	Maximum Spacing
Copper Piping/Tubing (Water And Condensate Drainage)	1-1/4” & less	6 ft. Horizontal 8 ft. Vertical
	1-1/2” & larger	8 ft. Horizontal 8 ft. Vertical
Refrigerant Piping	All	8 ft. Horizontal 6 ft. Vertical
Cast Iron Piping	All	4 ft. Horizontal 12 ft. Vertical

Where horizontal cast iron pipe is installed in 10ft. lengths, spacing must be increased to 9 ft. In addition to specified cast iron support requirements, provide additional support for cast iron pipe within 6” of each fitting on all sides of the fitting.

PVC	All	4 ft. Horizontal 8 ft. Vertical

Where vertically installed piping is provided, a guide must be installed midway between the specified/required vertical supports, at the base of each riser and at each floor. Such guides must prevent pipe movement in a direction perpendicular to the axis of the pipe.

4.6. **Protection of Physical Damage for Piping:** In concealed locations where piping is

installed through holes or notches in studs, joists, rafters or similar type members, the pipe must be protected by shield plates and grommets. Protective steel shield plates having a minimum thickness of 0.0575 inch (16 gage) must cover the area of the pipe where the member is notched, drilled or bored and must extend not less than 2 inches above sole plates and below top plates.

4.7. **Hanger Rods:** Must be mild steel, hot dipped galvanized, threaded as required. Rods must be selected as specified hereinbefore. Use not smaller than 3/8" rods for pipe 2" and under, 1/2" rods for pipes 2 1/2" through 4", 3/4" rods for 5" through 12" and 1" rods for piping over 12". Support rods with threaded Underwriters listed inserts, expansion shields or beam clamps must be all galvanized. Beam clamps must be equal to Elcen Fig. 34 or 36 with rod and eye end.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts and washers made of copper-coated steel.

At bar joists, support from bottom chord at panel points. For piping over 6" provide supplemental steel angle supports and welding to span 3 joists when running parallel to joists and welded angle between two panel points for piping running perpendicular to joists. Concrete inserts must be equal to Grinnell Figure 282.

Wherever piping hanger support rods heights exceed 36" length from top of the supported item to the structure above, Contractor must provide a Unistrut support assembly and bracing of the assembly with minimum 1"x1"x1/4" angle iron or as required for the weight of the supported item, whichever is greater and anchor to structure above to prevent swaying. Assembly must be welded at the connection to Unistrut and building structural assembly. Follow welding procedures set forth in the structural division of the specifications.

4.8. **Bracing:** Where hanger rods heights exceed 36", provide sway bracing as specified above in "Hanger Rods". Bracing must be provided at each Unistrut assembly and attached to the building structural system.

4.9. **Approved Equivalents:** By Grinnell, Elcen, Stockham or Crane will be accepted.

PART 5. IDENTIFICATION REQUIREMENTS

5.1. **Identification: All of the above ceiling identification specified must be completed prior to the above ceiling site visit. All remaining identification must be completed prior to the final site visit.**

The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

All identification must follow the nomenclature used on the plans.

All equipment, equipment access points, smoke detectors, smoke dampers, fire dampers, equipment filter access locations, access panels, motor starters, disconnects, thermostats, humidistats, sensors, valves, trap primers, control systems components, switches, all air handling equipment access doors and any other items

or devices which cannot be readily identified by the Architect, Engineer or Owner and his personnel, must be provided with engraved laminated plastic nameplates, as described below.

All filter access locations' identification must include the size and number of filters required for each specific piece of equipment.

Identify all access openings/panels/doors to indicate item for which access is provided. Ex. Motorized damper, fire damper, smoke detector, filters, valves, coils, etc. Additionally, add the following to each access identifier: "***ACCESS - DO NOT BLOCK***."

All above ceiling identification must have a corresponding engraved plastic label identifier neatly attached to the ceiling grid or in the case of wood ceilings, screwed to the ceiling, below the aforementioned equipment, item, valve, access door, etc. Attach to the ceiling grid with permanent adhesive. The engraved plastic labels background must match ceiling grid color with contrasting black or red letters as desired by the Architect. The label must have engraved on it the item being identified and its designation as shown on the plans, valve chart, etc.

Engraved equipment designation and numbers must be as shown on the Mechanical and Plumbing drawings on the upper half of tag, leaving lower half of tag for future engraving by Owner.

Identify all piping, including refrigerant suction lines, refrigerant liquid lines, condensate drainage piping located in concealed areas above ceilings and exposed to view in finished spaces, all water piping, jacket of all insulated pipe and all pipe exposed to view and/or accessible through removable ceilings, attics, access panels, etc... Sanitary vent piping above the ceiling, in chases and similar areas and condensate drainage piping on the floor in mechanical rooms or located on the roof, are not required to be identified. See subsequent part below for special requirements for refrigerant piping identification.

Identification must be visible from all sides of the piping, bear name of pipe contents and show direction of flow. Install identification within 12" of all flanges, valves, fittings, elbows, change in piping direction, at each branch take-off, both sides of floor and wall penetrations and along all straight runs of pipe not further apart than 15 feet.

Piping identification must be provided over every space, including small areas (closets, storage rooms, etc.) above accessible ceilings. All piping identification must be installed such that the Owner or maintenance personnel can remove any ceiling tile and visually identify any overhead piping with the specified identification markers.

Pipe labels must be factory fabricated, flat wrap-around markers that completely surround the pipe. The markers' colors, designations, etc., must comply with IBC/IPC/IMC requirements, ANSI/ASME Standard A13.1 and ANSI Z535.1, current editions. Markers must be Seton "Snap-Around" or Seton "Strap-Around" pipeline markers, Marking Services Inc (MSI) Series MS-970, Kolbi Pipe Marker Co., Brimar or approved equivalent. **Stick-on, painted, stenciled, handwritten or any non-factory fabricated type identification is not allowed.**

Fit all Plumbing dielectric unions and plumbing valves (except equipment service valves) with a custom laser engraved brass valve tag at each valve and dielectric union and include on the specified valve chart. Tag must be 1-1/2 inches in diameter,

18-gauge polished brass tags with 3/16-inch chain hole and 1/4-inch-high stamped, black-filled service designation. Number tags in sequence, starting with number 1; prefix the number with “P” for plumbing items. After numbering plumbing valves, also indicate valve numbers on the record/as-built drawings.

Provide a custom laser engraved brass valve tag identifying gas pressure main on house side of the meter. Tag must be 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation.

Provide a valve chart laminated and framed which indicates all the valve numbers and location of each valve and dielectric union and type of service of each valve (Cold water, hot water, hot water circulating, air, etc.). Locate a valve chart in each water heater room and each janitor closet. Permanently attach each chart to the wall as directed by the Architect. All valves’ numbers must also be shown on the Record drawings. Include a copy of the valve chart and the record drawings with the valves and dielectric union identification in the Owner’s Operation and Maintenance Manuals.

In addition to valves identification specified above, provide an engraved laminated label, of the type specified above and glue to the ceiling tile grid below the valve for each valve concealed from view. Where there is more than one valve located within a span of eight (8) feet, above the ceiling, it is not necessary to provide multiple identifiers on the ceiling grid. It will be acceptable to place a single identifier on the ceiling grid reading as, “Water Valves”. Each valve above the ceiling is still required to have its own individual valve tag and identified on the specified valve chart. Example: Over the toilets ceiling, there may be multiple shut-off valves to each individual fixture instead of to a bank of fixtures. Where there are multiple valves for each fixture, the Contractor may attach a single identifier on the ceiling grid or wood ceiling that states, “Water Valves”, or similar description. Thereafter, each individual valve above the ceiling still requires its own engraved valve brass tag as originally specified. The intent is to NOT have multiple individual identifiers for each valve exposed to view on the ceiling grid and thereby creating an undesirable appearance.

Access openings/panels/doors to all items requiring access must be permanently identified on the exterior of the access panel and on the ceiling grid below by a label having letters not less than 3/4” in height and reading: ***“XXX – DO NOT OBSTRUCT ACCESS“*** where “XXX” is the item requiring access.

Permanently affixed warning labels must be attached to all equipment, inside the facility and outside of the facility, on a highly visible location on the equipment or adjacent to disconnect for the equipment, which can be automatically started. The warning label must read as follows: ***“CAUTION!! This equipment is operating under automatic control and may start or stop at any time without warning. Place disconnect switch in the “OFF” position before servicing or attempting to work on equipment.”***

Permanently affixed warning labels must be attached to all motor starters and all control panels which are connected to multiple power sources utilizing separate disconnect switches. The warning labels must read as follows: ***“THIS EQUIPMENT IS FED FROM MORE THAN ONE POWER SOURCE WITH SEPARATE DISCONNECTS. DISCONNECT ALL POWER SOURCES BEFORE SERVICING OR WORKING ON THIS ITEM”***

Provide signage on each access point to the UV-C lights and on each side of the unit. Signage materials and methods must be as specified below, white letters with red background. Do not use the UV-C Manufacturer stick-on provided signage.

Warning signage must read as follows: ***"DANGER!! UV-C LIGHT SOURCE! UV-C RADIATION CAN CAUSE SEVERE BURNS OF THE SKIN AND EYE INJURIES. DISCONNECT POWER BEFORE SERVICING UNIT OR UV-C LIGHTING!"***

Labels must be Norplex-Micarta stock meeting ASTM D709, a minimum of 3" x 3" x 1/8" thick, laminated plastic labels (larger if needed) with engraved, all caps, 3/8" high, 1/8" stroke letters for thermostats, CO2 sensors and similar control devices in the finished space and 6" x 4" x 1/8" thick, laminated plastic labels (larger if needed) 3/4" high x 1/4" stroke numerals and all capital letters to identify all items furnished under Division 15 specifications, to include all warning signage, access panels, equipment and all other items above the finished ceiling requiring identification. Labels may be smaller but must be legible. The intent is to provide proper identification without it being aesthetically undesirable. If there is any doubt about appearance, coordinate with the Architect's field representative before proceeding.

Labels attached to the ceiling grid must be the same width as the ceiling grid to which it is attached. Properly adjust lettering height to fit within the smaller width label. Labels color on the ceiling grid must match the ceiling grid and be provided with contrasting black or red letters as desired by the Architect.

All items above the ceiling or in mechanical rooms, attics, mezzanines and similar type spaces must be red with white lettering.

Where the tag, label or marker occurs in a plenum (return air) space, the material employed must carry a Class A Flame Spread Rating per ASTM E84. If the material does not meet the Class A Flame Spread Rating per ASTM E84, provide custom laser engraved, 0.029" thickness, red, 316 Stainless Steel with white letters. Sizes, letter heights, etc. and colors must be as specified for the laminated plastic labels specified hereinbefore.

All piping exposed to view in unoccupied finished spaces, mechanical rooms, plumbing chases, housekeeping and similar spaces and jacket of insulated piping exposed to view in mechanical rooms, janitor/housekeeping and similar type spaces must be painted with two coats of compatible enamel paint in accordance with IBC/IPC/IMC color requirements and ANSI Standard A13.1, current edition. Do not use spray paint. After piping is painted, identify with pipe markers, valves tags, etc. as specified hereinbefore.

Exposed piping and the jacket of insulated piping in occupied finished spaces must be painted with two coats of compatible enamel paint, with color selected by the Architect.

Painting of the jacket of the insulated piping is not required where a protective aluminum jacket is specified and provided. Provide identification markers as specified hereinbefore on piping with aluminum jacket. Refer to Sections 15400 and Section 15700 for piping requiring aluminum jacket.

5.2. **Refrigerant Piping Identification: All refrigerant piping must be identified**. The pipe identification must be located at intervals not exceeding 15 feet on the refrigerant piping or pipe insulation. Provide piping identification over every space,

including small areas (closets, storage rooms, etc.) above accessible ceilings. All piping identification must be provided such that the Owner or maintenance personnel can remove any ceiling tile and visually identify any overhead refrigerant piping with the specified identification markers. Identification must be green with white lettering and with a minimum lettering height of 1".

IMC 1109.2.7 requires that the identification must indicate the refrigerant designation and safety group classification (A2L, etc.) and the type of refrigerant used (R-454B, etc.) in the piping system. For Group A2, A3, B2 and B3 refrigerants, the identification must also include the following statement: "***DANGER - Risk of Fire or Explosion. Flammable Refrigerant***." For any Group B refrigerant, the identification must also include the following statement: "***DANGER - Toxic Refrigerant***."

Basic identification for all refrigerant lines to and from all of the various split systems must be identified as specified above. Refrigerant piping identification must use the nomenclature on the plans for the specific unit it identifies.

Due to the complexity of the required identification, the piping may require multiple, side by side identification wrap arounds.

Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled, handwritten or any non-factory fabricated type identification is not allowed.

PART 6. MISCELLANEOUS REQUIREMENTS

6.1. **Materials and Equipment:** New and of best quality in every respect. Pipe and fittings must conform to the ASTM Standard designated for pipe of each material. Equipment must bear Underwriters Laboratories Inc. (UL) listing label, Canadian Standards Association (CSA) listing label or ETL approved rating.

All electrical components and products must also comply with the respective Code of Federal Regulations (CFR). All pressure vessels must be constructed and tested in accordance with applicable ASME Codes and must bear ASME stamps unless specified otherwise. Minimum pressure rating must satisfy job conditions.

Only manufacturers and products explicitly named in the specifications may be used without prior approval. Any proposed use of unlisted manufacturers or substitutions requires written approval submitted through the Architect, to the Engineer and must be obtained at least seven (7) calendar days prior to the bid due date, following the exact procedures outlined in Division 1.

Where units of the same class of equipment are required or specified, these units must be products of a single manufacturer, however, the component parts of each unit need not be. All major equipment must be provided by the same manufacturer throughout the project. No mix matching of equipment Manufacturers is allowed unless specified otherwise.

Architect must select all colors where a choice exists.

No materials or products that contain asbestos, formaldehyde, lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Where conflicts occur between a Code, Standard, Listing and the contract drawings or contract specifications, the most stringent requirements must govern and be applied.

6.2. **Workmanship:** Workmanship must be first class, premium and in accordance with superior practice. Work must be carried out by experienced mechanics and must present a neat and professional appearance. Exact location of pipe, duct, equipment, etc., must be determined in field, considering work of other trades. Do not attach any items to other trades' assemblies. Items must be separately attached to the building structural system. Except in unfinished areas and where specifically indicated on the plans or approved in writing, ductwork, piping, conduit, wiring and similar items must be concealed in the construction.

Aboveground piping must run parallel with the lines of the building, unless otherwise indicated. Branch pipes from water service lines must be taken from top or side of main, using crossover fittings required by structural or installation conditions. Refer to the plan details and other specification sections for gas piping and compressed air piping take-off requirements. Supply pipes, valves and fittings must be kept a sufficient distance from other work and other services to permit not less than 1 inch between finished covering on the different services. Bare and insulated lines must not bear directly against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines.

Lines required to be sloped have the right of way over those not required to be sloped. Lines whose elevations cannot be changed have the right of way over lines whose elevations can be changed. Lines and equipment whose locations are dimensioned have precedence over lines and equipment not dimensioned.

Pipe must be clean, cut clean, properly reamed, threaded or soldered, erected plumb and secure. Make changes in pipe size by reducing fittings without the use of bushings. Install all items in accordance with manufacturer's recommendations. Absolute coordination is required with the other Contractors on the project before proceeding with installation of any system or item.

At all stages of installation, protect pipe openings, floor drains, hub drains, fixtures, ductwork, condenser coils and equipment against the entrance of foreign materials and from damage by the elements, mortar, concrete, paint, etc. Plugs of rags, wool, cotton, waste or similar materials are not acceptable.

If air moving equipment must be used during construction, temporary filtration media with a Minimum Efficiency Reporting Value (MERV) of 11 must be installed at each return air grille, return air register, exhaust grille, exhaust register and unit return air inlet. ALL open portions of ductwork and equipment must be covered with a self-adhesive film (not Visqueen) or airtight sheet metal caps to prevent the intrusion of contaminants.

All equipment openings, duct openings, duct take-offs, etc., must be protected immediately after the tap, take-off, opening, etc. has been fabricated in the field. In effect, there must be no ductwork or equipment opening that is exposed to the ambient air. The material must be a minimum of 3 mils thick and have a minimum tensile strength of 10 psi. It must be waterproof and recyclable. Material must be DuroDyne Dyn-O-Wrap or approved equivalent.

Where bare sheet metal is delivered unassembled to the job site, all ductwork must be covered and protected with Visqueen. After fabricating the duct in the field, the interior bare metal must be wiped clean with a clean damp cloth before installing in the field. After installation, the duct must be protected as specified above. Any ductwork discovered to be unprotected as specified is subject to immediate rejection for use on this project.

6.3. **Testing Documentation:** Throughout the Division 15 specifications, there are various tests required and specified. Provide the Architect written certification and results of all tests specified, including those indicating failure. The absence of written testing certification and results will be considered the same as if testing was never done. Include all testing documentation in the Bound and Framed Instructions.

6.4. **Factory Finishes:** Furnish to the Architect, color cards for standard and premium colors available. The Architect must select color where choices exist. Provide Manufacturer's standard color where color choices are not available. Coordinate all color selections with appropriate Architectural specification sections.

6.5. **Expansion:** Provide for expansion and contraction of all piping, ductwork, etc. and make proper provisions so that excessive strain will not occur on piping, ductwork or other parts. Provide flexible connections for all piping and ductwork at all building expansion joints.

6.6. **Safety Provisions:** Provide covers or guards on all hot, moving, projecting items and at any other location that could be construed by the Engineer, Owner or Architect as a hazard. Provide full size expanded metal grilles over all exhaust/relief air assemblies on all packaged equipment to protect against any intrusion to motorized dampers, gravity backdraft dampers, etc.

6.7. **Cleaning and Adjusting:** Upon completion of work, clear all drains, traps, fixtures, ducts and pipe. Adjust all valves, remove rubbish and leave work in clean and excellent operating condition. Clean and polish all floor drains, floor and wall cleanouts, wall hydrants and any other exposed metal objects.

Install final permanent type filters only after cleaning of building is completed.

6.8. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Do not use split ring type escutcheons.

Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin.

6.9. **Delivery and Storage:** All equipment and materials delivered and placed in storage must be protected from the weather, humidity and temperature variations, dirt and dust and other contaminants. See Section 15700 and this Section 15010 for additional requirements for ductwork and equipment.

6.10. **Dielectric Isolation:** Provide dielectric isolation where dissimilar metals are joined, at supports, etc. For pipe sizes 2" through 6", copper piping flanges must be drilled to ANSI B 16.5 150/125 Standard and powder coated, with an EPDM insulator adhered to the plate steel flange protruding inside of the steel flange to prevent contact with the copper flange adapter. The copper component of the flange adapter must be

Third Party Classified by Underwriters Laboratories, Inc. Minimum working pressure must be 300 psi at 272°F.

6.11. **Miscellaneous Bonding/Grounding of Metallic Items:** Wherever any bare metallic piping, conduit, structural elements or any other metallic assembly is in contact with externally insulated duct or bare sheet metal duct, bonding/grounding must be provided. The Contractor must provide 1/2" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to snuggly and completely cover the respective metallic item. The insulation must extend the full length of the affected area. Where channel shapes are used, orient the open side of the Unistrut assembly down. Materials that are not supported by Unistrut, sheet Armaflex may be used provided it is properly attached to the duct or affected items. Refer to Section 15700, Part "Pipe and Miscellaneous Insulation Work" for AP Armaflex material specification.

END OF SECTION

SECTION 15400

PLUMBING

PART 1. GENERAL & MISCELLANEOUS

1.1. **General Provisions:** Section 15010 is applicable in full hereto. No building materials or products that contain asbestos, formaldehyde, polychlorinated biphenyl (PCB), lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Do not fabricate, or install, any pipe or equipment until all coordination has been accomplished. Refer to Section 15010 for coordination requirements.

1.2. **Qualifications:** The Plumbing Contractor and the required third party Insulation Contractor must be properly licensed and established at the location of the work and must maintain adequate local service facilities. They must have had previous experience in the satisfactory installation of at least six (6) systems of this type, size, complexity and scope.

PEX-A installer(s) must have demonstrated experience on six (6) projects of similar size and complexity and possessing documentation proving successful completion of PEX-A plumbing installation training by the PEX-A tubing Manufacturer. The PEX-A Contractor must submit his factory certification of training from the PEX-A Manufacturer with the plumbing submittal. Failure to provide the certification at the submittal stage will be cause for automatic rejection of the entire plumbing submittal.

1.3. **General Scope:** The Plumbing Contractor must furnish and install all equipment, materials and labor required to provide a complete and fully operating plumbing system, even though every item may not be specifically indicated on the drawings or specified. The Contractor must refer to the architectural drawings to verify all plumbing fixture locations and mounting heights. All ADA compliant fixtures must be mounted in accordance with current ADA requirements and as directed by the Architect.

All advisory provisions listed in the Codes referenced in the Contract Documents must be considered mandatory. In the event of any conflict between applicable Codes, Standards, Listings, Contract Drawings or the Contract Specifications, the most stringent requirements govern. The Contractor must provide, install and comply with whichever imposes the strictest requirement, highest standard and greatest obligation. No exceptions or leniency will be granted. These requirements are intentionally strict to ensure project quality, regulatory compliance, fairness in bidding and protection of the Owner's interests. Non-compliance carries significant risk of financial responsibility, schedule impacts and potential contract default. Bidders and Contractors assume these obligations fully upon participation or award.

Bidders must thoroughly review all contract documents during the bidding period. Any missing information, ambiguities, conflicts, discrepancies, or other issues that could affect accurate pricing must be promptly brought to the Architect's attention in writing before the bid due date. This allows all questions to be clarified, and any necessary corrections made prior to bidding. Failure to identify and resolve such issues before submitting a bid will obligate the Contractor to furnish and complete the work, including

any disputed or omitted items, using the specified materials and methods, and the Architect and Engineer's requirements, at no additional cost to the Owner or the Owner's Design Professionals, as directed by the Owner's Design Professionals.

Plumbing items must not be attached to assemblies belonging to other trades. All items must be independently and separately attached to the building's structural system.

Manufacturers or products not specifically named in the specifications require prior approval, which must be requested at least seven (7) days prior to the bid date and submitted through the Architect in accordance with Division 1 and Section 15010.

Where units of the same class of equipment are required or specified, these units must be products of a single manufacturer, however, the component parts of each unit need not be. All equipment must be provided by the same manufacturer throughout the project. No mix matching of equipment Manufacturers is allowed unless specified otherwise.

Piping systems must be routed as directly as possible, installed straight and true to line and grade, properly supported and free of sags or unnecessary bends. Runs must form right angles and run parallel with building lines. Piping must be located as high as practical and grouped in parallel runs spaced as closely together as practical.

All penetrations through floors and partitions must be built-in as construction progresses. Where required penetrations in new construction were not built-in as required by the specifications, the Contractor must core drill or saw cut openings sufficiently large enough to accommodate all piping, conduits, firestopping assemblies, related items, etc. without interruption and to allow proper firestopping as required by Code and these specifications.

Reconstruction of any modified items must be performed as directed by the Architect. The Plumbing Contractor must coordinate all repair and rebuilding work with the General Contractor prior to bidding to ensure proper installation of carriers, piping and associated items.

Prior to installation, all piping must be inspected, upended and thoroughly swabbed clean. All piping must be clean and free of rust at the time of installation. Any dirt or rust resulting from storage or ground contact must be removed. Any piping installed with dirt must be cleaned. The use of spray paint is not permitted. Refer to the gas piping section for specific painting requirements. All paint must comply with ASTM E84 for flame spread and smoke developed indices.

Prior to commencement of any backfilling operations, the Plumbing Contractor must take accurate as-built measurements, including all depths and inverts. Centerline locations alone are insufficient. Definitive measurements must be recorded for each line entering and leaving the building. **The location of all buried piping must be shown on the record (as-built) drawings and dimensioned from permanent fixed points.**

Refer to Section 15010 for additional requirements.

1.4. **Contractor Requested Electronic Drawing Files:** Not available.

1.5. **Site Visits:** It is the Contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, the Engineer, any governmental agency or any other entity requires an additional site visit with the Engineer present, the Contractor must pay Zgouvas, Eiring & Associates a re-visit fee of $2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled site visit.

Before requesting the final site visit, the General Contractor must provide the Mechanical Engineer and the Architect with a copy of the Mechanical Engineer's above ceiling corrected punch list. The corrected list must be signed and verified by the Plumbing Subcontractors' respective supervisors and the General Contractor to confirm that all items have been resolved. **If any item marked as corrected/complete is found to be uncorrected/incomplete during the final site visit, the site visit will be considered a failure, and a reinspection fee will be imposed.**

The Contractor is urged to carefully review the extensive requirements of Part "Identification" in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

1.6. **Governmental Inspections:** The Plumbing Contractor must arrange and pay for the State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions, Elevators/Boilers Inspector to visit job site to inspect water heater and/or boiler installation and air compressor installation. The Plumbing Contractor must obtain written approval, certification, tags and Certificate for Potable Water Heater (PWH) and air compressor as required. **This inspection must be accomplished prior to the final site visit; to include the tagging of the equipment with the inspection tag, else DCM will cancel the site visit and impose a reinspection fee.**

Correct all deficiencies required by the Inspector without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods, as directed by, State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions and Elevators/Boilers inspector as required.

1.7. **Record Documents:** Provide in such detail, as is set forth under General and Supplemental Conditions and in Section 15010. **Prior to commencement of any backfilling operations, the Plumbing Contractor must take accurate as-built measurements, including all depths and inverts. Centerline locations alone are insufficient. Definitive measurements must be recorded for each line entering and leaving the building. The location of all buried piping must be shown on the record (as-built) drawings and dimensioned from permanent fixed points. Also, show locations of all dielectric unions and all valve numbers on the record documents.**

1.8. **Buy American:** Manufacturers of all products, materials, equipment, components and systems specified in Division 15 must comply with the Buy American Act and the American Recovery and Reinvestment Act of 2009 (ARRA) and 2025 Code of Alabama Title 39 - Public Works, Chapter 3 - Use of Domestic Products and Resident Workmen for Public Works, Improvements, Etc.

Exceptions to these requirements will be permitted only where the specified items are proven to be unavailable from domestic U.S. sources. Examples of items that may qualify for exception include certain porcelain plumbing products. Any request for exception must be submitted in writing to the Architect/Engineer for prior approval and must include supporting documentation demonstrating that no suitable domestic product is available. Where three (3) or more U.S. manufacturers can furnish products that meet or exceed the requirements of the Contract Documents, only domestic (U.S. manufactured) products must be provided.

During the submittal phase, the respective manufacturer must provide a conformance letter on the manufacturer's official company letterhead. The letter must be signed by an Officer of the Manufacturer's Board of Directors and must explicitly certify full compliance with the Buy American Act and ARRA. Failure to include this conformance letter with the submittal will result in immediate rejection of the submittal without review.

1.9. **Access Panels and Doors in Finished Areas:** Do not locate serviceable items above inaccessible, hard ceilings or in partitions without written approval from the Architect. Coordinate all items locations with the Architectural plans before installing any items. Furnish access panels and doors to the General Contractor for installation wherever required for access or maintenance to any items including but not limited to valves, controllers, actuators, trap primer assemblies, water hammer arrestors, air vents, cleanouts, etc.

Access panels/doors in finished areas or areas exposed to view must be suitable for wall or ceiling finish involved, 24" x 24" unless otherwise indicated or as required to permit removal of equipment and provide acceptable maintenance access. Access panels and doors must be fire rated where rated assemblies are penetrated.

Access panels and doors must be manufactured by Milcor, Elmdor, Zurn, Mifab or approved equivalent. The Architect must approve the use of and type of all panels and doors to be installed in areas that are exposed to view or in finished areas.

Access panels/doors exposed to view and in finished spaces must be factory cleaned and primed for painting in the field. Colors must be selected by the Architect. Refer to Architectural Section, Painting, for additional information.

For detention and similar institutional type facilities, refer to Section 1122 for type of access panels/doors required.

Refer to Section 15010, Part Access Panels and Doors for additional requirements.

1.10. **Warranty:** Guarantee work as set forth in Section 15010 and Division 1. Guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of substantial completion of the project as determined by the Architect, unless specified otherwise. Flush valves and faucets must be provided with a

complete replacement, including labor and a five year guarantee in the event of failure. Provide free maintenance and service during the guarantee period. Refer to other parts for additional requirements and extended warranty requirements.

1.11. **Miscellaneous:** Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

The Contractor must carefully examine the contract documents during the bidding phase. Any missing information, clarifications, etc. in the contract documents that is required to provide accurate pricing must be brought to the attention of the Architect, **prior to bid date**, so all may be clarified and/or corrected. Failure to identify and resolve any issue prior to bid must require the Contractor to provide said items, complete, without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods specified by and as directed by the Owner's Design Professionals.

Refer to Section 15010 for additional requirements.

1.12. **Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.

1.13. **Electrical Work:** All electric power wiring required for installation of equipment under this Section is specified under the Electrical Division. The Plumbing Contractor must furnish and install all controls and control wiring as specified or required to properly complete the installation. Control conduit is specified under the Electrical Division or shown on electrical drawings; all other control conduit must be provided under this Section of the work.

All control conduit, power wiring, relays, transformers, contactors, etc. which are required and are not shown on the electrical drawings or specified in the Electrical Division of the specifications, must be provided under this Plumbing Section.

Coordinate all requirements with the Electrical Sub-Contractor prior to bid. Electrical work performed under this Section must meet the requirements set forth in the Electrical Division and the National Electric Code (NEC), current edition.

1.14. **Submittals:** Refer to Section 15010 for **strict requirements** and, especially as it applies to format, project cost constraints, addendums and Value Engineering (VE) items. **Only ONE complete submittal will be accepted for review.** Do not submit plumbing fixtures separately without the remaining required plumbing items. Providing submittals piecemeal is not allowed. If a partial or incomplete submittal is provided, it is cause for immediate rejection.

1.15. **Identification:** The Contractor is urged to carefully review the extensive requirements of Part "Identification" in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. **There are specific identification requirements prior to the above ceiling and final site visits,**

respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

1.16. **Firestopping:** Refer to Section 15010, Part 2, "Miscellaneous Requirements to be Coordinated with Other Trades", Paragraph "Firestopping". **Note that Division 15 firestopping specifications require firestopping of all penetrations regardless of wall/ceiling/floor construction. Refer to Division 1 regarding additional requirements.** Where there is a conflict between Division 1 specifications and Division 15 specifications, the most stringent requirements must govern, are applicable and must be provided.

1.17. **Motors:** All furnished motors must be designed, manufactured and tested in accordance with the current applicable standards of NEMA, ANSI, IEEE and ASTM. As a minimum requirement, all motors must conform to the current applicable sections of NEMA Standard No. MG-1. Motors must meet or exceed The Consortium for Energy Efficiency (CEE) Premium Efficiency full load efficiencies. All motors must be listed under the UL recognized component file as applicable. All motors must be suitable for installation according to the requirements of NEC. Motors must be wound for the specified voltage and a 1.5 service factor, 1750 RPM open drip proof construction unless otherwise shown or specified. Premium efficient motors must be **warranted for 36 months** from the date of substantial completion of the project, as determined by the Architect.

All motors must be provided with overload protection and phase protection on all legs. Do not run motors until correct overload elements are installed in starters, as applicable.

All motors serving outdoor equipment exposed to weather must have TEFC motors meeting the requirements set forth previously.

Motors must be manufactured by Regal Rexnord Corporation, Emerson Electric, Franklin Electric, AMETEK, Inc, Baldor Electric Company/ABB, Nidec Corporation, Siemens AG or ABB Group.

1.18. **Fusing:** Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

1.19. **Operating and Maintenance Manuals: Two weeks before the final site visit**, furnish three complete sets of operating and maintenance instructions, bound in hard cover, indexed and tabbed.

The Contractor must also provide this information in digital Adobe Acrobat PDF format, on a CD-R CD. The PDF file must be provided with an embedded index for each specified item. The index must appear in the left hand window of the opened document so that the Owner or his maintenance personnel can "click" on the indexed item and move immediately to that specific item.

Minimum requirements for the Operating and Maintenance Manuals must be as follows:

a. The first page of the bound instructions must be a listing of:

    1. The Owner/Project Title.
    2. The Architect and Architect's Job Number.
    3. The Engineer and Engineer's Job Number found in the Engineer's logo in the bottom right corner of the Plumbing Plans and in the footer of this specification section.
    4. The General Contractor and Contact Information.
    5. The Plumbing Subcontractor and Contact Information.

b. Second page must be a Table of Contents listing all products in the order which appear in the specifications and label the tab accordingly. Include all "P" numbers for fixtures, water heater numbers, valves, floor drains, etc.
c. The third page must be a summary page that lists each item with its respective warranty listed, including all extended warranties.
d. All warranty card information must be filled in by the Plumbing Contractor; Serial numbers, Model Numbers, etc. all as required for proper warranty registration. The warranty registration date must be the date of substantial completion as determined by the Architect.
e. Provide copies of all filled in warranty cards.
f. Provide a local source of supply for parts and replacement, including names and telephone numbers of parts suppliers.
g. Provide a general maintenance summary section. Section must be a list of each piece of equipment or device using the designations as shown on the plans and the routine maintenance procedures based on the respective manufacturer's recommended intervals. As a minimum, maintenance must be grouped and individually tabbed to indicate maintenance operations required:

    1. Once a month
    2. Quarterly
    3. Once every six months
    4. Once a year

h. Provide drawings of system controls and wiring diagrams and condensed operating instructions. Include hard copy in binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical/water heater room(s) in an optimally viewed location for the respective equipment.
i. Provide written results of all specified tests.
j. Copies of all Site Visit Reports including Contractor's written response that items listed were corrected.
k. Copies of all certificates of all site visits, comments and approvals from all Governing Authorities, to include all Boiler and Pressure Vessel inspections by the Authority Having Jurisdiction, as applicable.
l. Provide domestic water samples testing and results specified.
m. Provide a copy of the valve chart required in Section 15010, Part Identification. Include all dielectric unions on chart.
n. Provide copy of Section 15010 and 15400 Specifications.
o. Provide a copy of all shop drawings/submittals.
p. Provide record drawings of the Plumbing drawings, in hard copy and PDF format on CD. Refer to Section 15010, Part 1, General, Paragraph, Record Drawings for

detailed requirements. Prior to commencement of any backfilling operations, the Plumbing Contractor must take accurate as-built measurements, including all depths and inverts. Centerline locations alone are insufficient. Definitive measurements must be recorded for each line entering and leaving the building. **The location of all buried piping must be shown on the record (as-built) drawings and dimensioned from permanent fixed points. Also, show locations of all dielectric unions, cleanouts and all valve numbers on the record documents.**

PART 2. TESTS

2.1. **General: Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.** Perform all tests in the presence of the Architect. Refer to Division One for Fuel, water and power required, therefore. In absence of specific testing procedure comply with code requirements and/or nationally acceptable industry standards. Furnish written reports of all tests results specified to Architect.

Once the tests are conducted as specified below, seal any leaks discovered and then repeat the testing process until all tests are successfully completed and the systems are fully verified.

2.2. **Drainage and Vent System Pretest: Do not test PVC or any non-metallic piping with compressed air.** A water test must be applied to the drainage system in its entirety. All openings in the pipe must be tightly closed and sealed airtight with cast iron or PVC caps as applicable for the pipe installed, except the highest opening. Then, the system must be filled with water to the point of overflow.

If the system is tested in sections, each opening must be tightly closed and sealed airtight with PVC or cast iron caps as applicable for the pipe installed, except the highest openings of the section under test. Each section must then be filled with water. Sections must not be tested with less than a 10-foot head of water. In testing successive sections, not less than the upper 10 feet of the next preceding section must be tested so that no joint or pipe in the building, except the uppermost 10 feet of the system, must have been submitted to a test of less than a 10-foot head of water.

Test pressure must be held for not less than 8 hours. Check all portions for leaks. Correct all leaks and retest. The system must then be tight at all points.

Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.

2.3. **Drainage and Vent System Final Test: Do not test PVC or any non-metallic piping with compressed air.** A smoke test must be utilized as a final test. It must be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines as required to achieve the specified pressure. **Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.**

When the smoke appears at stack openings on the roof, the stack openings must be sealed airtight with PVC or cast iron caps and a pressure equivalent to a 1-inch water column must be held for a test period of not less than 8-hours. Check all piping visually

for smoke leakage and odors and correct all leaks.

The final test of the completed drainage and vent systems must be visual and in sufficient detail to determine compliance with the provisions of the International Plumbing Code.

2.4. **Water Supply System Test:** Test and secure acceptance of entire system before the piping is insulated or otherwise concealed. **Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.**

Disconnect and cap all outlets to all plumbing fixtures and all other equipment not designed for the full test pressure. Fill the system with water and prove tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi. This pressure must be held for not less than 10 hours without a loss of pressure.

The water utilized for the test must be obtained from a clean potable source of supply. All piping throughout must be airtight under test. Water piping must remain under normal water pressure during construction except when freezing weather is expected.

Refer to PEX piping specification for testing pressure requirements.

2.5. **Fixtures:** Test for soundness, stability of support and satisfactory operation.

PART 3. SANITARY PIPING

3.1. **General Scope:** Provide a system of soil, waste and vent piping connecting all plumbing fixtures, equipment, etc. to the house sewer, with consolidated vent connections extending through the building roof, all as shown on the drawings and as required for complete installation. All piping must be concealed below grade, within walls, chases, above ceilings, etc., unless specifically noted otherwise. Waste and vent piping must be sloped in accordance with the applicable codes.

The Plumbing Contractor is responsible for and must consider pipe-grading requirements when coordinating pipe routing for the project. The Contractor must determine inverts/connection points in the field based on the shop drawings of the sanitary system submitted. Coordination is required with the Civil Contractor before proceeding.

Do not begin work until the elevation of the final connection point is verified and grading of entire system can be determined (even if final connection is specified under another Section.)

Do not route the sewer line in the same trench as the domestic water line. Maintain a minimum of six (6) feet of separation between the two utilities.

Each pipe length and each pipe fitting, trap, fixture, material and device utilized in the plumbing system must bear the identification of the manufacturer and any markings required by the applicable referenced standards.

Rework existing waste roughing as required to facilitate renovation work as applicable.

3.2. **Utility Connection:** Utility connection is specified under Division 2. Connect to temporarily capped main as indicated on the plumbing plans.

3.3. **Soil, Waste and Vent Piping Underground, Inside the Building Walls and to Points Outside the Building as Indicated:** Provide service weight hub-and spigot cast iron soil pipe and fittings for underground service and hubless for above ground service, meeting ASTM A-74 for hub and spigot and ASTM A-888 for hubless, coated inside and out. The pipe exposed within the building must be uncoated outside, primed and left clean for painting. Fittings to receive screwed pipe arms must be recessed drainage type. Soil and waste pipe must have long sweeping connections. All cast iron soil pipe and fittings must be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

Joints for hubless pipe and fittings must be equivalent to MG couplings meeting ASTM A-48 and ASTM C-564, or Anaco Husky SD 4000, super-duty, shielded couplings of Type 304 AISI stainless steel, meeting ASTM C1540 and Factory Mutual 1680, Class 1 and vulcanized virgin compound in which the primary elastomer is neoprene conforming to ASTM C-564. Equivalent by Ideal Tridon Heavy Duty HD (Green) or Charlotte Pipe Heavy Duty HD (Green) are acceptable.

Option: Contractor may use solid wall PVC Schedule 40 DWV pipe and fittings meeting ASTM Standard D2665 and ASTM Standard D1785 for above ground service and underground service with the following exceptions. Use cast iron as specified hereinbefore or PVDF (Polyvinylidene Fluoride) piping and fittings in areas used as return air plenums, return air platforms, commercial dishwasher, commercial washer/extractors, steam kettles, any equipment or item whose discharge into the sanitary system is greater than 125°F and when passing through or within a fire rated assembly.

Piping and fittings above and below the floor must be solid wall PVC Schedule 40 DWV pipe and fittings, cast iron pipe and fittings as specified above or PVDF pipe and fittings as specified below and with exceptions as noted.

THE USE OF "CELLCORE" OR "FOAMCORE" TYPE PIPING IS EXPRESSLY FORBIDDEN.

PVDF piping and fittings, where specified and required, must be Orion Super Blue PVDF (Polyvinylidene Fluoride) or equivalent products manufactured by Enfield, Zurn, GEO or Fisher. The PVDF material must conform to ASTM D3222 ASTM F1673, ASTM E-84 and UL 723. Pipe must be marked with its UL Classification to indicate compliance with UL723 (ASTM E84). All fittings must meet or exceed Schedule 40 dimensions.

All vents through roof, regardless of type provided, must be cast iron pipe (minimum 10" both sides of the roof). Secure the cast iron VTR to structure with heavy gauge 1-hole strap.

All floor drains and hub drains must have Zurn Z1000, or equivalent by other specified manufacturers, cast iron deep seal p-trap with trap primer and required connections.

3.4. **Laying Out Work:** Vents from any fixture, when connected to a vent line serving other fixtures, must be extended at least 6 inches above flood level rim of highest of such fixtures to prevent use of vent lines as a waste. Make changes in direction by appropriate use of 45-degree Y's, 1/2 Y's, or long sweeping 1/4, 1/6, 1/8 or 1/16 bends. Sanitary T's or short 1/4 bends may be used on vertical stacks or drainage lines where change in direction of flow is from horizontal to vertical; except that long-radiused, double TY's must be used when two fixtures are installed back-to-back with common drain. Do not use double sanitary Tees. Straight Tees, Ells and Crosses may be used on vent lines. Make no change in direction of flow greater than 90 degrees. Where different sizes of drainage pipe or fittings are connected, use standard increasers and reducers of proper size. Do not reduce the size of drainage piping in direction of flow. Drilling and tapping of house drains, soil, waste or vent pipes and use of saddle hubs and bands are prohibited. Route all vent lines high as possible while maintaining proper slope. All plumbing vents **through the roof, regardless of type provided must be cast iron and located a minimum of 10'-0" away from all outside air intakes**. Coordinate all plumbing vent locations with the HVAC plans prior to routing vent piping through the roof.

3.5. **Protection of Physical Damage for Piping:** In concealed locations where piping is installed through holes or notches in studs, joists, rafters or similar type members, the pipe must be protected by shield plates and plastic grommets. Protective steel shield plates having a minimum thickness of 0.0575 inch (16 gage) must cover the area of the pipe where the member is notched, drilled or bored and must extend not less than 2 inches above sole plates and below top plates.

3.6. **Grading:** Uniform and not less than 1/8" PLF for pipe 3" and over and not less than 1/4" PLF for piping less than 3".

3.7. **Hangers and Supports:** Refer to Section 15010, Part Piping and Supports below and plan details for requirements.

3.8. **Roof Flashing:** Roof penetrations are to be flashed by the roofing Contractor, using materials as recommended by the roofing manufacturer and approved by the Architect. Roof penetrations of existing roofs must be provided by the roofing Contractor that holds the warranty of the existing roof. Coordinate work with Roofing Contractor. Offset vents as required to clear gravel guards and flashing courses. Extend vents to 10" above roof level.

3.9. **Waste Arms:** Type K copper or IPS brass pipe typical. Alloy steel or IPS brass pipe at urinals.

3.10. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.

3.11. **Test Fittings:** Not shown on the drawings. Provide where required for partial tests.

PART 4. DRAINAGE SPECIALTIES

4.1. **Manufacturers:** Except as noted, catalog numbers are from J.R. Smith and/or Zurn. Equivalents by Josam, Sioux Chief or MIFAB will be considered.

4.2. **Cleanouts:** Provide in sanitary piping at all changes in direction, at ends of branches, at intervals not exceeding 40 feet on straight runs and elsewhere as shown. Cleanouts must be fully opening type and completely accessible without obstruction. Size same as lines in which they occur, but not larger than 4 inches. Tees and extensions must be of same weight as soil pipe. Plugs must be countersunk or raised head type with lead-free seals. Coordinate with plan details and specifications and provide as required. Provide flashing clamps and flashing flanges in all areas where cleanouts are accessible from floor below or above, as applicable. All cleanouts must be with bronze plugs and cover as shown on the plan details and specified below, regardless of pipe type provided (cast iron or PVC).

Extreme care must be taken when roughing in cleanouts in each wall mounted lavatory and hand sink. Cleanouts must be located within the specified Lav Shield piping cover when possible. All cleanouts must be roughed in high enough to clear the Architectural base molding without cutting the base molding.

All cleanouts must be indicated on the record/as-built drawings.

In Tile Floors: J.R. Smith 4052L, Zurn Model ZN1400-T-BP, adjustable, cast iron body with bronze plug and satin finished square scoriated nickel bronze top. Where soft tile occurs, provide 4172L, Zurn ZN1400-TX-BP, recessed square nickel bronze cover.

In Concrete Floors: J.R. Smith 4238L, Zurn Model Z1400-BP, adjustable head, cast iron head and ferrule with bronze plug, round loose-set scoriated tractor cover.

In Outside Lines: J.R. Smith 4262L-NB, Zurn Model Z1474-N-BP, cast iron head and ferrule with bronze plug. Terminate cleanout within 8” of finish grade at grade in 18”x18”x12” deep concrete pad with tooled edges or flush in pavement as applicable. Provide with loose set scoriated bronze tractor cover as shown on the plan details.

In Accessible Unfinished Spaces: J.R. Smith 4400 or 4511-S, Zurn Model ZS1468, cast iron with bronze plug, as appropriate.

In Finished Walls: J.R. Smith 4530S, Zurn Model Z1446-BP cast iron cleanout tee with bronze plug and 16 ga., 304 stainless steel, flat, wall plate cover. Where distance from plug to finish wall exceeds 4 inches provide extension from sanitary tee to bring plug within 2 inches of the stainless steel cleanout cover. rough in all wall cleanouts such that stainless steel cover occurs above the Architectural base. Do not cut Architectural base.

In Terrazzo Floors: J.R. Smith 4192L, Zurn Model ZN1400-Z-BP, adjustable cast iron head and ferrule, bronze plug and round nickel bronze cover and rim.

PART 5. WATER PIPING

6.1. **General Scope:** Connect to water main as indicated and extend to all plumbing fixtures, wall hydrants, trap primers, water heaters, ice machines, etc.; and to HAC, kitchen, laboratory, laundry and special equipment and all other plumbing items as indicated or required.

Piping systems must be sloped to drain points. Drain points are not shown on the plans. They must be determined in the field based on the actual system installed. The Contractor must grade pipe upward from source to facilitate drainage and air relief.

Where low points are required because of long runs or where sections may be valved off, provide with 3/4" ball valve and hose nipple for drainage at low point.

All piping must be concealed below grade, within walls, chases, above ceilings, etc., unless specifically noted otherwise.

Refer to Section 15010 for hanger rods, hangers, spacing, firestopping, sleeves, uni-strut support assembly, etc., requirements.

6.2. **General Workmanship:** Cut water piping accurately to measurements established at site and work into place without springing or forcing, clearing all openings, finished ceilings, etc.

All piping not in an accessible attic or similar spaces that contain valves and other items which may require maintenance or service access must be located no more than 12” above the finished ceiling. Piping located in attics must be supported such that maintenance access can be accomplished without the use of a ladder.

In finished spaces where water piping is exposed to view, route piping high as possible. Where valves or other items requiring service or maintenance are shown in piping of finished areas and exposed to view, the piping must be installed high as possible, except where a valve or other item requiring maintenance and service is shown in the line, the item must be no more than 14’-0” above the finish floor. Provide a drop, offset, etc., as required to maintain maximum service height of 14’-0” above the finished floor.

Route all piping through previously built-in sleeves/firestopping assembly as specified in Section 15010. Avoid excessive cutting or other weakening of the building structure. Make changes in direction and size with fittings. Cap or plug open pipe ends during installation to keep out foreign material. Make connections carefully to ensure unrestricted flow, eliminate air pockets and to permit complete drainage of the systems.

Supply piping to fixtures, faucets, hydrants, showerheads and flush valves must be anchored to prevent movement.

Install all buried piping with at least 36" of earth cover. Do not route the water line in the same trench with the sewer/sanitary piping. Maintain a minimum of six (6) feet of separation between the two utilities.

Uninsulated pipes passing through concrete or cinder block walls and floors, or other corrosive material must be protected against external corrosion by a protective sheathing or wrapping that will withstand any reaction from the lime and acid of concrete, cinder block or other corrosive material. Sheathing or wrapping must allow for movement including expansion and contraction of piping. The wall thickness of the sheathing material must be not less than 0.125 inch thickness. The protective wrapping/sheathing is not an alternative where sleeves are specified and required. Coordinate requirement with Section 15010 sleeves/firestopping specifications and provide as specified.

All piping below slab-on-grade construction must be installed in plastic jacket equivalent to Plasti-Sleeve, as manufactured by Plastic Products Co. of Stanton, California.

6.3. **Protection of Physical Damage for Piping:** In concealed locations where piping is installed through holes or notches in studs, joists, rafters or similar type members, the pipe must be protected by shield plates and plastic grommets. Protective steel shield plates having a minimum thickness of 0.0575 inch (16 gage) must cover the area of the pipe where the member is notched, drilled or bored and must extend not less than 2 inches above sole plates and below top plates.

6.4. **Freeze Protection: Do not install piping or any device in spaces subject to freezing.** All water piping must be routed within the building insulation envelope unless specifically noted otherwise. Route all overhead water piping and water piping within masonry and non-masonry walls within the building insulation envelope.

All overhead piping must be located between the architectural air barrier at the bottom of the structure and the finished ceiling. Do not route overhead piping in the attic where it can be located between the architectural air barrier and the finished ceiling.

All water piping shown to be located in exterior perimeter masonry walls must be insulated before being routed within the cells of the masonry block. If block is to be cut to allow for the installation of the insulated piping it must be in strict accordance with the procedures required by the Structural Engineer and the Architect. **Do not allow masonry block cells that contain water piping to be filled with concrete.**

Piping located in exterior stud walls must be located on the warm side of the insulation.

6.5. **Water Piping Insulation:** Refer to Part Pipe Insulation for requirements.

6.6. **Grading:** The Contractor must consider pipe-grading requirements when coordinating pipe routing for the project. All piping must be carefully installed to eliminate traps and pockets in pressurized lines. Where air pockets and traps cannot be avoided, provide valved hose connections for water traps and valved automatic air vents for air traps. The pipe slope must be maintained throughout the project.

Pressurized plumbing piping systems must be sloped to drain points. Drain points are not shown on the plans. They must be determined in the field based on the actual system installed. The Contractor must grade pipe upward from source to facilitate drainage and air relief. Where low points are required because of long runs or where

sections may be valved off, provide with 3/4" ball valve and hose nipple for drainage at low point. **Make all connections to risers and fixtures from top or sides of mains. Do not make take-offs from bottom of mains.**

6.7. **Nipples:** Of same material as pipe in which they are installed. Provide extra strength when unthreaded portion is less than 1 inch long. Steel nipples are not allowed.

6.8. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.

6.9. **Piping and Fittings: ProPress or similar type joints and fittings are not allowed.** Typical lines to be of copper tubing meeting ASTM B-88, Type L hard above ground and Type K soft below ground. Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth, No. 00 cleaning pads or wire brush. No acids must be used to clean either pipe or fittings or as a flux in sweating joints. Make up joints with sweat fittings of wrought copper and 0.25% of the total wetted surface area, lead free compliant solder complying with ASTM B-32 and the Safe Drinking Water Act. Surfaces must be prepared for soldering as required by ASTM B828. Do not make joints or branch connections below a slab on grade.

6.10. **Hangers and Supports and Sway Bracing:** Refer to Section 15010, this Section 15400 and plan details for requirements.

6.11. **House Supply Connection:** Utility connection at street, meter installation, etc. is specified under Division 2. Connect to temporarily capped main as indicated. Where shut-off valve is indicated outdoors on the plumbing plans, provide a concrete or steel valve box with hinged medium duty, traffic rated cover, minimum 16x16, larger as required for proper access to valve. Provide valve extension as required so that top of valve handle is within 8” of top of hinged cover.

6.12. **Water Pressure:** Supply system is designed for static pressure of 50 to 75 psi. Gauge the city water supply adjacent to building to verify that pressure is within those limits. Submit report in writing. Provide a water pressure reducing valve, if required, to meet designed water pressure. See Water Piping Specialties for pressure reducing valve specification.

6.13. **Disinfection:** New potable water systems must be purged of deleterious matter and disinfected prior to utilization. The method to be followed must be as prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in AWWA C651 or as described in this section below.

The potable water piping system must be flushed with clean, potable water until dirty water does not appear at the points of the outlet. The system or part thereof must be filled with a water/chlorine solution containing not less than 50 parts per million of chlorine and the system or part thereof must be valved off and allowed to stand for 24 hours; or the system or part thereof must be filled with a water/chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3

hours. Following the required standing time, the system must be flushed with clean potable water until the chlorine is purged from the system.

Upon completion of the disinfection procedure, the Plumbing Contractor must engage the services of the Alabama Department of Public Health Clinical Laboratories or a certified, licensed, testing laboratory to provide a lead and bacteriological water analysis to include a standard heterotrophic plate count (HPC), microbial, bacterial, pathogens and coliform count.

Test a minimum of one (1) sample of domestic water from within the facility. Where the project has multiple buildings, the requirement must be one (1) sample for EACH building.

Test locations must be selected by the Architect and must be noted on the Testing Laboratory's report. Test each sample for Coliform Present, Fecal Present, E. Coli and lead present.

If the test results for any building or portion thereof indicates positive results for Total, Fecal, or E. Coli coliform per 100 ml respectively, or an HPC greater than 500 CFU/mL, or lead maximum contaminant level goal (MCLG) greater than zero, the Contractor must disinfect the system in its entirety, as specified above and obtain new test results as outlined hereinbefore until levels are reached as required by AWWA C651. If maximum contaminant level goal (MCLG) of lead is greater than zero, immediately notify the Architect in writing and furnish copy of test results.

Prior to the final site visit, the Contractor must provide to the Architect the certified test results on the testing facility letterhead. The report must indicate the name of the project, the locations from where the samples were taken, the testing laboratory findings and written indication whether the water is safe for consumption. **No Certificate of Occupancy will be provided to the Owner without the required lab results indicating the potable water system is safe for consumption.**

6.14. **System Drainage:** Provide valves and hose nipple to allow for drainage of all risers and other system low points.

PART 7. PEX-A DOMESTIC/POTABLE WATER PIPING

7.1. **General**: The PEX Water Piping must be for **piping above the floor slab only** and to a point 4'-0" above the finished floor must remain copper as specified above. All water piping risers in chases or other locations where there are plumbing fixtures must be copper for 4'-0" vertically and, copper through the wall/partition to where it connects to the plumbing fixture or plumbing item so that the piping can be mounted securely. **Hot water PEX-A must not be used where water temperatures exceed the Manufacturer's recommended use.**

Piping must be SDR9 cross linked polyethylene manufactured using the Engel method PEX-A AquaPEX White, straight length tube only. **Coiled or Crimp Ring PEX are not allowed.** All piping must be concealed within walls, chases, above ceilings, etc., unless specifically noted otherwise.

Installer must be certified by the PEX-A tubing manufacturer to install the PEX-A potable water distribution system. The Contractor must submit certificates of satisfactory completion of the Manufacturer's Training Certification for all installers at the submittal stage of the project. Installers who are not certified by the PEX-A tubing Manufacturer are not allowed. Failure to provide the Letter of Certification with the submittals will be cause for immediate rejection without review.

At the conclusion of the project, the Owner must be provided with two (2) extra stock, brand new complete sets of tools and two (2) extra stock, brand new sets of spare parts. Spare parts and tools must be as follows:

1. Milwaukee 2633-22HD M18 3/4" – 3" ProPEX Expansion Tool.
2. Milwaukee 2633-22HD - M18 Force Logic ProPEX Expansion Tool Kit with 3/4", 1", 1-1/4", 1-1/2", 2", 2-1/2" and 3" Heads.
3. Two (2) M18 XC Batteries and Charger.
4. Milwaukee 2932-22XC M18 1/2" – 2" ProPEX Expansion Tool 2932-22XC.
5. Milwaukee 2932-22XC - M18 FUEL 2" ProPEX Expander Kit w/ ONE-KEY & 1/2" - 2" Expander Heads.
6. Milwaukee 2532-22 M12 1/2" – 1" ProPEX Expansion Tool 2532-22.
7. Milwaukee 2532-22 - M12 FUEL ProPEX Expander Kit w/ 1/2"-1" RAPID SEAL ProPEX Expander Heads.
8. Three (3) 10' length for each pipe size indicated on the plans.
9. Four (4) PEX couplings for each pipe size indicated on the plans.
10. Four (4) PEX tees for each pipe size indicated on the plans.
11. Four (4) PEX Ells for each pipe size indicated on the plans.
12. Fourteen (14) PEX expansion sleeves for each pipe size indicated on the plans.

After the installation is completed, and prior to insulating the PEX-A piping, it is mandatory that the Plumbing Contractor have the PEX-A Manufacturer's representative visit the site to inspect the installation. The Representative must provide the Architect, the Engineer, the General Contractor and the Plumbing Contractor with a list of deficiencies to be corrected. Contractor must correct all deficiencies listed by the Manufacturer's representative. The Manufacturer's representative must certify in writing that the installation is in strict accordance with the specifications and the Manufacturer's installation requirements and recommendations**.**

7.2. **Design Requirements:** Standard Grade hydrostatic pressure ratings from Plastics Pipe Institute in accordance with TR-3 as listed in TR-4. The following three standard-grade hydrostatic ratings are required.

a. 200 degrees F at 80 psi.
b. 180 degrees F at 100 psi.
c. 73.4 degrees F at 160 psi.
d. Must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

7.3. **Performance Requirements:** To provide a PEX-A tubing hot and cold potable water distribution system, which is manufactured, fabricated and installed to comply with regulatory agencies and to maintain performance criteria stated by the PEX-A tubing manufacturer without defects, damage or failure.

1. Comply with ANSI/NSF Standard 14.
2. Comply with ANSI/NSF Standard 61.
3. Show compliance with ASTM F877.
4. Show compliance with ASTM F876.
5. Show compliance with ASTM E119 and ANSI/UL 263 through certification listings with Underwriters Laboratories, Inc. (UL).
6. Show compliance with ASTM E84.
7. Show compliance with ASTM E814.
8. Piping must show a laboratory seal or mark attesting to suitability for potable water.

7.4. **Quality Assurance:**

Installer Qualifications: Installer(s) must have demonstrated experience on six (6) projects of similar size and complexity and possessing documentation proving successful completion of PEX-A plumbing installation training by the PEX-A tubing manufacturer. The PEX-A Contractor must submit the six (6) projects of similar size and scope projects with his plumbing submittal for evaluation.

Regulatory Requirements and Approvals: Provide a domestic potable system that complies with requirements of the following:

1. International Code Conference (ICC).

Certifications - The following Letters of Certification **must be provided with the submittals** as follows:

1. The installer is certified by the PEX-A tubing manufacturer to install the PEX-A potable water distribution system.
2. Installer must utilize skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed tradesperson.

7.5. **Warranty:**

A. Project Warranty: Refer to Conditions of the Contract for project general warranty

provisions.

B. Manufacturer's Warranty: Submit for Engineer's acceptance, manufacturer's standard warranty document executed by authorized company official. The manufacturer's warranty is in addition to and not a limitation of, other rights owner may have under contract documents.

1. The warranty must provide for repair or replacement of any tube or fittings that are proven to be defective.
2. Warranty must be transferable to subsequent owners.
3. Guarantee Period for the PEX-A water distribution system must be a minimum of 25-years, non-prorated warranty against failure due to defect in material or workmanship, beginning on the date of substantial completion, as determined by the Architect.

7.6. <u>Hot and Cold Potable Water Distribution System</u>:

Manufacturer:

1. Uponor, Inc. (Basis of Design)
2. Heatlink
3. Sioux Chief
4. Zurn
5. Rehau

7.7. <u>Materials</u>:

A. Tubing:

1. Material: SDR9 cross linked polyethylene manufactured using the Engel method (PEX-A) AquaPEX White, straight length tube only. **NO CRIMP connections in PEX A are allowed. Coiled PEX is <u>not</u> allowed. NO CRIMP** connections in PEX A or use of F-960 expansion fittings is allowed.
    a. Minimum degree of cross-linking must be between 70-89% when tested in accordance with ASTM D2765, Method B.
2. Piping must be plenum rated where plenums occur.
3. Material Standard: Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent, third-party agency. Piping to have a minimum material designation of PEX 5106.
4. Potable water piping must comply with NSF 14 and NSF 61 and bear the "NSF-PW" marking.
5. Temperature and pressure requirements in accordance with PPI TR-3: 73.4°F at 160 psi, 180°F at 100psi and 200°F at 80psi.
6. Standard grade hydrostatic design and pressure ratings from PPI.
7. Fire rated assembly listings in accordance with ANSI/UL 263.
8. PEX-A tubing must only be permitted in locations specified and below the PEX-A manufacturer's maximum temperature recommendation.

B. Fittings, Elbows, Couplings, Adapters, etc.:

Manufactured Joint: 1/2 inch through 3-inch nominal pipe size.

1. ProPEX lead-free (LF) brass copper fitting adapters for connecting Uponor PEX piping to ASTM B88 Type K, L or M copper pipe and ASME B16.51 copper press fittings.

1. ProPEX lead-free (LF) brass elbows for connecting to PEX piping and NSF/ANSI/CAN 372, ASTM F877, ASTM F1960, CSA B137.5, UL 1821, NSF/ANSI/CAN 61 and NSF/ANSI 14 listed.
2. All must be ASTM F1960 ASTM F877, ASTM F1960, CSA B137.5, NSF/ANSI 14, NSF/ANSI/CAN 372, NSF/ANSI/CAN 61.
3. Reinforcing cold-expansion rings must be manufactured from the same source as PEX-A and marked “F1960”.

C. Valves:

Must be ProPEX ASTM F1960 lead-free (LF) full-port brass, commercial ball valves with lead free compliant ProPEX stainless-steel ball and stem extensions as required to raise valve handle above 2” thickness insulation. Valves must be rated 250 psi cold working pressure and 200°F at 200 PSI temperature/pressure hydrostatic rating.

D. Piping Insulation:

Insulation materials and methods must be as specified for domestic water piping in this 15400 Section. Preinsulated piping is not allowed.

E. Accessories:

1. Transition to copper Type “L” prior to stub-out at all fixture rough-ins and a minimum of 4’-0” in vertical where piping is located within walls, chases and similar locations. The intent is to ensure a rigidly anchored, non-flexible, anchored vertical pipe and rigid horizontal stub out connection to each item requiring hot/cold water.
2. Expander tool to install the ASTM F1960 compatible fittings must be supplied to the Contractor by the PEX-A tubing manufacturer.
3. The tubing manufacturer must provide stainless steel cable ties and PEX-A metal support for supporting tubing runs. Support channel and tubing must be of the same PEX manufacturer. No plastic or non-metallic supports are allowed.
4. All horizontal pipe hangers and riser clamps must be metal, rigid, epoxy-coated material and in compliance with ASTM E-84. Refer to Section 15010 and this Section 15400 for hanger and saddle requirements.
5. Provide Manufacturer recommended metal, rigid supports, hangers, clamps, F704 Supports and all other required items for a Manufacturer recommended installation.
6. Provide metal bend supports and 23 ga. galvanized steel pipe supports.
7. Remaining items required must be as specified in Section 15010 and Section 15400 for copper water piping to include pipe hangers, saddles, piping insulation, etc.

7.8. Installation:

A. Tubing:

1. Install tubing in accordance with the tubing manufacturer's recommendations and as indicated in the installation handbook by a factory-trained installer.
2. Do not install PEX-A tubing within 6 inches of gas appliance vents or within 12 inches of any recessed light fixtures.
3. Do not solder within 18 inches of PEX-A tubing in the same waterline. Make sweat connections prior to making PEX-s connections.
4. Do not expose PEX-A tubing to direct sunlight.
5. Ensure no glues, solvents, sealants or chemicals encounter the tubing.
6. Use grommets or sleeves at the penetration for PEX-A tubing passing through metal studs.
7. Protect PEX-A tubing with sleeves and where specified in Section 15010 and Section 15400.
8. Use strike protectors where PEX-A tubing penetrates a stud or joist and has the potential for being struck with a screw or nail.
9. When the edge of the pipe is less than 1.5 inches from the nearest edge of a stud, joist, rafter or similar member, the pipe must be protected by shield plates and plastic grommets. Protective shield plates must be a minimum of 0.62 inches thick (16 ga.).
10. Use tubing manufacturer supplied bend supports where bends are less than six times the outside pipe diameter.
11. Minimum horizontal supports are to be installed not less than 32 inches between hangers in accordance with applicable codes and the Manufacturer's installation handbook.
12. PEX-A riser installations must be provided with riser clamps installed at the base of the ceiling per floor and at midpoints.
13. Mid-story support is required for all piping applications.
14. Pressurize tubing with air or hydrostatically in accordance with applicable codes or in the absence of applicable codes to a pressure of 25 psi above normal operating pressure of the system.
15. Comply with safety precautions when pressure testing, including use of compressed air, where applicable. Do not use water to pressurize the system if ambient air temperatures have the possibility of dropping below 40 degrees F.

B. Through Penetration Firestop:

1. Refer to Section 15010, Para. 5.10, Firestopping for firestopping requirements. Note that all interior floor and wall penetrations that extend to the deck/floor above require firestopping.
2. A list of firestop manufacturers that list PEX tubing with their firestop systems is available from the PEX tubing manufacturer.

C. Piping: PEX-A (SDR9 cross linked polyethylene manufactured using the Engel method) must be acceptable if the following is met:

(1) Minimum degree of cross-linking must be between 70-89% when tested in accordance with ASTM D2765, Method B.

(2) Manufactured in accordance with ASTM F876 and ASTM F877 and

tested for compliance by an independent, third-party agency.

(3) Piping to have a minimum material designation of PEX 5106.

(4) Potable water piping must comply with NSF 14 and NSF 61 and bear the "NSF-PW" marking.

(5) Temperature and pressure requirements in accordance with ASTM: 73.4°F at 160psi, 180°F at 100psi and 200°F at 80psi.

(6) Pipe must be PEX-A.

D. **Piping Joints**: Manufactured Joints must be ASTM F1960 cold-expansion type and must comply with the following:

(1) Reinforcing cold-expansion rings must be manufactured from the same source as PEX-A piping and marked "F1960".

(2) Potable water fittings must comply with NSF 14 and NSF 61 and bear the "NSF-pw" marking.

(3) All threaded fittings must be lead free compliant brass.

(4) Fittings must have the same inside diameter as the piping.

E. **Testing**: Testing must be performed, documented and submitted per the manufacturer's requirements.

F. **Supports, Clamps and Hangers**: Must be PEX-A Manufacturer provided Pipe Support system. Supports must be Series F704 and Series Q741 strapping or equivalent by PEX-A manufacturer.

(1) Refer to Section 15010 for piping spacing requirements.

(4) Minimum distance from fitting end of ProPEX ring to PEX-A pipe support must be per manufacturer's installation instructions per pipe size.

G. Installers:

(1) Installers must be trained and certified by the PEX-A manufacturer to install the PEX-A potable water distribution system. Provide certificates of satisfactory completion for all installers at the submittal stage of the project. Installers without factory certification are not allowed.

(2) Installers must utilize skilled workers holding a trade qualification license or equivalent, or apprentices under the supervision of a licensed tradesman.

PART 8. WATER PIPING SPECIALTIES

8.1. **General:** All specialties in potable water distribution must be certified for lead free compliant design as required by Code, Regulations and Standards.

All specialties/valves must be bronze or heat-treated DZR, CW511L brass, lead free compliant, AB 1953 compliant, NSF/ANSI 61 compliant and must be the product of one American Manufacturer and must meet the Buy American Act 41, USC 10a-10d as specified hereinbefore. Valves must have MSS SP-25, MSS SP-80 listings as applicable. Provide extended operators for all valves installed in insulated piping. Seal the opening where the stem, nipple, etc., penetrates the insulation as required to maintain the continuity of the insulation and vapor barrier.

All valves must be identified. Refer to Section 15010, Part Identification Requirements. Provide a custom laser engraved brass valve tag at each valve. Tag must be 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation. Number tags in sequence, starting with number 1; prefix the number with "P" for plumbing items. After numbering plumbing valves, also indicate valve numbers on the record/as-built drawings. Refer to Section 15010, Part Identification for detailed requirements and provide all as specified.

Valves must be Nibco, Jomar, Watts, Apollo, Kitz, Hammond/Milwaukee, Matco-Norca or Mueller. Nibco and Jomar units are the basis of design unless specified otherwise.

8.2. **Unions:** 150 psi rated; WOG pattern, cast brass ground-joint type in copper pipe. Unions in steel pipe must be malleable iron, WOG female pattern brass seat, ground joint, 150 psi type. Provide in all sizes of threaded pipe and in sweat-jointed pipe over 1 inch, to facilitate easy repairs. In such lines, install at all inlets and outlets of all devices and equipment, adjacent to water heaters, pumps, tanks, etc. into which piping is terminated; and on each side of valves, cocks, strainers, etc. and other devices that occur in piping runs.

8.3. **Dielectric Unions:** Provide dielectric unions between ferrous and non-ferrous piping as required, including piping and water heater stubs where different and stainless-steel water hammer arrestors. Dielectric unions must be constructed using lead free compliant materials as required by all Governmental Agencies, Codes and Standards and must comply with ASTM 1545. Dielectric unions must be Watts Series LF or equivalent by Mueller or Matco Norca. Where dielectric unions are installed, they must be provided with factory fabricated brass tag. 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation. Indicate valve tags on the record drawings. **Contractor must provide a ball valve on the respective piping containing the union as required to allow for proper maintenance of the union.**

8.4. **Valves and Valve Extensions/Standoffs:** Provide as specified, including all fixtures or equipment not furnished with stops. Arrange and install valves to be readily accessible for servicing. All valves must be bronze or heat-treated CW511L brass, lead free compliant, AB 1953 compliant and must be the product of one American Manufacturer and must meet the Buy American Act 41, USC 10a-10d as specified hereinbefore. Nibco and Jomar units are basis of design.

All valves require extensions/standoffs, regardless of the situation. Provide minimum of 2" height extension, higher as required by the insulation thickness. All handles must comply with UL 2043 and must be UL listed for installation in return air plenums. Valve extensions must be provided by the valve manufacturer and must have

blowout-proof stems. Valve extensions must be Matco-Norca (for Matco-Norca valves) P759EXT, Nibco Series RG (for Nibco valves) or similar type extensions for the other specified valve manufacturers and constructed of all brass or stainless steel.

8.5. **Check Valves 2" and Smaller:** Y-pattern swing type, threaded (ANSI B1.20.1), all lead-free bronze body, rated 300 WOG / Class 150 WSP, manufactured in accordance with MSS SP-80 and certified to NSF/ANSI 61 and NSF/ANSI 372 and must be Jomar T-511G, NIBCO T-413-Y-LF or approved equivalent.

8.6. **Exterior Wall Hydrants (WH):** Encased, Ecolotrol, lead-free compliant, non-freeze automatic draining wall hydrant for flush installation. Hydrant must have integral backflow preventer with anti-siphon type, copper casing, all-bronze interior components with 1/2 turn long-life ceramic disc cartridge, combination 3/4" female solder and 3/4" male pipe thread inlet connection, 3/4" male hose connection', with type 304 stainless steel housing with locking hinged cover stamped "WATER" and operating key. Hydrant housing must fit within one standard modular masonry course. Install approximately 32 inches above finished grade.

Provide one extra stock spare hydrant repair kit and one extra stock spare cartridge removal tool for EACH wall hydrant.

Seal all interior joints, seams, gasket seams/closures including around the hydrant box flange with an appropriate sealant recommended by a sealant manufacturer. Wall hydrant must be JR Smith 5519 QT, Zurn Z1320XL-EZ or approved equivalent by Woodford.

8.7. **Water Hammer Arrestors (Shock Absorbers):** Certified by the American Society of Sanitary Engineers and in compliance with current edition of ASSE 1010, ANSI A112.26.1M, Plumbing and Drainage Institute Standard PDI-WH201, heavy-duty construction and designed for a minimum 150-PSI working pressure. Arrestors must consist of a Type 304 stainless steel casing and piston. The device must be pre-charged and sealed at the factory. Install on both hot and cold water branch lines in an upright position as close as possible to the valve or valves being served.

Arrestors must be installed at all solenoids, remote operated or quick closing valves and at each electric water cooler, each plumbing fixture or battery of plumbing fixtures. Type, location and size must be as recommended by the arrestor Manufacturer. Plumbing Contractor must provide a dielectric union at connection of this device to the copper water piping.

Arrestors must be Zurn Z1700, J.R. Smith Hydrotrol Series 5005-5050, Watts Series SS, Sioux Chief Series 660-G2B or MIFAB Series WHB.

8.8. **Pressure-Reducing Valve and Strainer:** Verify water pressure at site prior to ordering. Device may not be required. If required, provide Zurn/Wilkins 500XL-YSBR or equivalent to Apollo or Watts. Provide full size valved bypass around PRV, two pressure gauges, a hose bibb, valve and union on each side of PRV. Provide if required to meet designed water pressure (not to exceed 70 psi).

PART 9. PIPE HANGERS AND SUPPORTS

9.1. **General: "Sammy" bolts are prohibited.** Refer to Section 15010, this Section 15400, plan details and Pipe Insulation requirements below. Refer to PEX-A requirements above for PEX-A support requirements.

9.2. **Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts and clamps on Unistrut assemblies are not required to be painted or coated.

All damaged or rusted steel pipe, all uncoated cast iron pipe and all hangers, Unistrut and other support assemblies, must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See specification section, Part "Identification" for detailed requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

PART 10. PIPE INSULATION

10.1. **General:** Provide a complete insulation submittal on his company letterhead detailing materials and methods as specified.

Where a conflict exists between these specifications and the Manufacturer's recommendations, the strictest installation must be provided.

Piping must be clean; dry and pressure tested before covering is applied. Size pipe hangers to fit insulated pipe size. **No installation of pipe hangers for insulated piping will be allowed to be in contact with piping or penetrate the piping insulation. Piping insulation must be continuous through partitions sleeve/firestop assembly and must not be cut away for installation of clamps, valves, fittings, etc.** Refer to details on plans, Section 15010, "Pipe Hangers and Supports", plan details and below for additional requirements.

Insulate all hot and cold water piping except that below grade and excluding plated brass fixture connections. All piping must be routed within the building insulation envelope to prevent freezing.

Cover fittings, valves and flanges with insulation material as hereinafter specified to same thickness as adjacent pipe covering except screwed unions and other

specifically mentioned items. Neatly bevel covering edges adjacent to unions, valves and other points of termination and seal insulation. All insulation materials (including coatings, mastics, jackets and adhesives) must have a composite flame spread rating not to exceed of 25/50 rule as determined by ASTM E-84, NFPA 255 and UL 723.

For PEX-A installations, after the piping installation is completed and prior to insulating the PEX-A piping, it is mandatory that the Plumbing Contractor have the PEX-A Manufacturer's representative visit the site to inspect the installation. The Representative must provide the Architect, the General Contractor and the Plumbing Contractor with a list of deficiencies to be corrected. Contractor must correct all deficiencies listed by the Manufacturer's representative. The Manufacturer's representative must certify in writing that the installation is in strict accordance with the specifications and the Manufacturer's installation requirements and recommendations. **Do not insulate any PEX-A piping until the certification has been received by the parties listed above.**

Fiberglass piping insulation Manufacturers must be Owens Corning SSL II with ASJ Max Fiberglas, Johns Manville Micro-Lok HP Ultra or Knauf Pipe Insulation with ASJ+. Owens-Corning is the basis of design.

10.2. **Installation of Fiberglass Insulation:** No installation of pipe hangers for insulated piping will be allowed to be in contact with piping or penetrate the piping insulation. Refer to details on plans for additional requirements. Size the hanger loops to fit **over** insulation. Insulate with Owens Corning SSL II with ASJ Max Fiberglas, Johns Manville Micro-Lok HP Ultra or Knauf Pipe Insulation with ASJ+ pipe insulation, thickness as shown below, thermal conductivity of k= 0.23 Btu-in/hr-ft2-ºF at 75ºF mean temperature and minimum 3.5 pcf to 5.5 pcf density (size dependent). Insulation must comply with ASTM C547 (Type I), ASTM C411, ASTM C585, ASTM C795, ASTM C335/C1045, ASTM E96, ASTM C1136 (Types I, II, VII, X – jacket, ASTM C795, NFPA 90A and 90B and be UL Labeled for Flame Spread Index of 25 or less and Smoke Developed Index of 50.

Adhere SSL by removing release paper after the insulation is installed on pipe and sealing the lap starting in the center of each section, working towards ends. Lap must be pressurized by rubbing with a plastic sealing tool. Install 5" butt strips in the same manner at the joint between sections and at 5'-0" on center. Staple jacket flaps and premolded PVC fittings with nominal 3/4" wide stainless steel or Monel outward-clinching insulation staples on 12" centers. PVC covers must be stapled on both sides of the fitting. Insulation staples must have a retarder coating or covered with 4" width 3M Venture Tape Film Faced ASJ Facing Tape, Series 106FXP adhesive tape or vapor barrier mastic that conceals the entire staple. Thereafter, neatly seal the entire jacket flap with vapor retarding sealant. Neatly bevel and seal all insulation at all unions to allow for the proper operation of the union without damaging the insulation.

Sealant must be water based, LEED, UL 723 (ASTM E84), ASTM C731/C732 Standard Test Method for Extrudability, ASTM E96 Water Vapor Permeance and ASTM D5590 Antifungal. The sealant must be Vimasco 739 (Brush Seal), Childers Chil-Perm CP-34 or Foster 30-65.

Insulate all fittings and elbows with premolded fiberglass fittings containing 3lb. density **rigid** polyisocyanurate pipe insulation of equal thickness as the adjacent

piping with PVC covering and UL Labeled for Flame Spread Index of 25 or less and Smoke Developed Index of 50.

Cold Water/Domestic Water Insulation Thickness

All pipe sizes 1" thickness

Hot Water/Domestic Hot Water Insulation Thickness

For pipe sizes up to 1-1/4" – 1.0" thickness.
For pipe sizes 1-1/2" to 6" – 1.5" thickness.

10.3. **Insulation for Piping Within Concrete Block Walls:** Do not use fiberglass insulation within concrete block walls. Insulate with 1" or 1.5" thickness insulation for the respective piping as specified above. Insulation must be black, flexible foamed, elastomeric, closed cell pipe insulation with a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.26 at 90°F mean temperature and a water vapor transmission rate of 0.05 perm-inches or less. Slip insulation onto pipe prior to installation. **Slit insulation and longitudinal cutting of the insulation is prohibited. Slip insulation onto pipe prior to erecting. Do not stretch or bend insulation at any turn, tee, etc.** Insulate sweat/brazed fittings with miter-cut pieces of insulation as recommended in AP Armaflex installation instructions or, provide factory fabricated, made to order prefabricated fittings for tees, elbows, unions, etc. the same size as on adjacent piping as manufactured by AP Armaflex, Aeroflex Aerofit, K-Flex Insul-Tube or Aerocell.

10.4. **Fiberglass Insulation Fittings:** Insulate with Fiberglas insulation mitered to fit snugly or with PVC covers with integral, 3lb. to 4lb. density **rigid** polyisocyanurate pipe insulation or rigid fiberglass of the same thickness as the adjacent pipe insulation. After installing the insulation and PVC covers, staple, seal, etc. as specified above. Do install sealant over PVC covers. Install cover, staple, seal PVC cover to the pipe insulation with 3M Venture Tape Film Faced ASJ Facing Tape Series 106FXP and then neatly cover the tape joints with the specified sealant.

Sealant must be water based, LEED, UL 723 (ASTM E84), ASTM C731/C732 Standard Test Method for Extrudability, ASTM E96 Water Vapor Permeance and ASTM D5590 Antifungal. The sealant must be Vimasco 739 (Brush Seal), Childers Chil-Perm CP-34 or Foster 30-65.

In lieu of premolded PVC covers at elbows and fittings that contain rigid polyisocyanurate pipe insulation as specified hereinbefore, Contractor may, at his option, miter the specified fiberglass insulation, delete the requirement for the taped joint and PVC covers and then seal joints as specified hereinbefore.

Loose insulation within premolded covers is not allowed. Insulation must be as specified above or mitered.

Premolded PVC covers must have a flame spread index of 0-25 and a smoke developed index of 0-50 when tested in accordance with ASTM E84.

10.5. **Insulation Exposed Ends:** Finish open ends of sectional covering by rounding off with cement and sizing with fiberglass cloth jacket around the pipe and finish with mastic cement as specified above.

Neatly bevel and seal all insulation at all unions and valves to allow for the proper operation of the union and valve without damaging the insulation.

10.6. **Partitions and Floors:** Refer to Section 15010 Pipe Sleeves and Firestopping. In any case, insulation must extend through floors, partitions and walls and firestopped. Note that Section 15010, Firestopping, requires firestopping of all penetrations, regardless of rating. Refer to Section 15010, Firestopping, for specifics and additional requirements.

10.7. **Electric Water Coolers:** Insulate drain connections and traps with 1/8" thick insulating tape by AP Armaflex, K-Flex or Aerocel AC EPDM or 1/2" thick fiberglass insulation as specified for piping insulation.

10.8. **Unistrut Support Saddle Requirements:** For all horizontally or vertically installed piping, provide a Unistrut assembly with a factory fabricated pre-formed, pre-insulated saddle assembly consisting of an integral hot dipped G-90, ASTM A653 compliant galvanized saddle per table below. Do not use loose saddles. The assembly must be a 360-degree section of 3.0 PCF density, non-compressive, rigid phenolic foam insulation up to 3" nominal pipe size (NPS), 4.0 PCF density polyisocyanurate foam insulation for piping 3-1/2" NPS to 10" NPS and 6.0 PCF density, non-compressive rigid phenolic or polyisocyanurate for piping greater than 10" NPS. For IPS 6" and above provide an additional load distribution plate of all point loaded Unistrut or trapeze hangers. Insulation and ASJ+ jacketing must extend a minimum of 2" beyond the shield to allow for sealing the 2" wide ASJ+ butt strip tape.

The 3.0 PCF and 4.0 PCF polyisocyanurate foam pipe insulation must have a K factor of 0.19 Btu·in/hr·sq. ft/°F at a mean temperature of 75°F. The 6.0 PCF foam pipe insulation must have a K factor of 0.20 Btu·in/hr·sq. ft/°F when tested to the ASTM C518 standard. The entire assembly must be ASTM D1621, ASTM C209, ASTM E96, ASTM D2856 compliant.

Each assembly must have a 6-mil thickness, industrial grade vapor retarder film in compliance with ASTM D-374 and 0.01 perm rating in compliance with ASTM E-96. The assembly must also be provided with an insulation lock joint longitudinal seam. The insulation jacket must have a hazard rating not to exceed 25 flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723. Insulation thickness required must be same as the adjacent fiberglass insulation as specified above.

Installation must be in strict accordance with the Manufacturer's requirements. After installation, install 3" zero perm butt strips at the joint between insulation sections where fiberglass insulation and the polyisocyanurate insulation butt together. Staple insulation jacket flaps and seal staples as specified above for fiberglass insulation.

Each assembly must have a genuine "Quick-Inspect" sticker applied at the bottom of each saddle for easy jobsite verification by the Engineer or Inspector. **Failure to**

provide the sticker on each assembly will be cause for immediate rejection of the installation.

Refer to the plan details for additional requirements.

The assembly must be Buckaroos Model 3300E-LT or equivalent by Thermal Pipe Shields, Inc, Pipe Shields, Inc. Carpenter & Paterson, Inc., Clement Support Services, Piping Technology and Products Inc., Bergen Pipe Supports, Insulation Components or VEP/ASC Engineered Solutions. Buckaroos Model 3300E-LT is the basis of design.

Unistrut Saddle Requirements

Nominal Pipe Size	Insulation Length	Saddle Length	Saddle Gauge
1/2" - 3"	6"	4"	22 Ga.

10.9. **Clevis Hanger Saddle Requirements:** For a single pipe suspended with a single clevis hanger assembly, provide same insulated saddle assembly as specified above for the Unistrut assembly. Do not use multiple side by side single saddle assemblies. Multiple pipe assemblies require a Unistrut assembly as shown on the plans. Refer to Section 15010 and the plan details for additional requirements.

10.10. **Painting:** Paint exposed insulation that is not covered with aluminum jacket after insulation is completed as specified in Section 15010.

10.11. **Identification:** Refer to Section 15010, Part Identification for identification of piping systems.

PART 11. FIXTURES SUPPORTS AND CONNECTIONS

11.1. **General:** Verify exact size and location of water, vents, waste and supply connections from approved rough-in drawings and/or catalog data sheets. Allow for modifications required by the shop drawings without additional cost to the Owner or the Owner's Project Design Professionals.

All fixtures must be securely fastened to the walls or floor. **Coordinate all mounting heights and fixture types required with Architectural plans prior to rough-in and ordering fixtures. All ADA fixtures must be mounted as required by current ADA requirements.**

11.2. **Wall Mounted Fixtures:** All fixtures specified with carriers must be supported and installed with carriers. All fixtures specified without carriers must be supported as specified below.

Support all wall mounted fixtures that are specified without carriers using 1/4" thick 6" high plates full length and width of fixture, mounted behind wall. Where fixtures are back to back on a solid wall, mount with bolts from fixture hanger to fixture hanger. Do not use toggle bolts or expansion bolts unless noted on the plans or specified.

Where fixtures are mounted on solid (single wythe) walls finished both sides, install fixtures with plated toggle bolts.

Where fixtures are mounted on wood or light gauge steel studs, employ pressure treated blocking of 2” x 12” nominal size well secured into stud line with non-corrosive, dielectric separation fasteners. Fit behind stud flanges, using especially placed studs as required.

11.3. **Floor Connections:** Provide cast iron or galvanized malleable iron floor flanges at least 3/16" thick, screwed or caulked to cast iron drainage pipe. PVC floor flanges may be used where PVC piping is provided. Bolt the connection and make tight to fixture with plumbing fixture setting compound, wax setting ring or polyethylene gasket flange. Offset flanges for water closets are not allowed.

11.4. **Water Supply Connections:** Provide rigid, lead-free brass nipple from water riser to fixture stop valve threaded connections. Steel pipe is unacceptable. Exposed portion of nipple must be chromium plated. Stops’ risers must be lead-free, threaded with chrome over copper pipe. Quick connect fittings and braided supplies are not allowed.

11.5. **Waste Arms to Fixtures:** As specified hereinbefore. Where copper or brass pipe is specified, all joints downstream from the trap must be brazed joints.

PART 12. SCHEDULED FIXTURES AND MISCELLANEOUS ITEMS

12.1. **Acceptable Manufacturers:** American Standard, Zurn, Elkay, Kohler and Toto catalogs.

Where three (3) Manufacturers are listed for fixtures below, use only those Manufacturers. Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found. All prior approvals must be submitted through the Architect.

Architect must select all colors where choices exist.

12.2. **Fixture Trim:** Exposed metal parts to be of heavy weight polished brass, heavily chromium plated, of best quality as regularly furnished by the plumbing fixture manufacturer. Provide stop valve in supply to all fixtures and equipment.

12.3. **Compliance with Americans Disabilities Act:** All fixtures, faucets, flush valves, etc., specified or shown to be ADA type must be manufactured and installed in complete compliance with the current requirements of the Americans Disabilities Act and ICC A117.1 Standard for Accessible and Usable Buildings and Facilities

12.4. **Guarantee:** Guarantee in writing to make good without cost any defects in materials and workmanship for one (1) year.

Warranty/guarantee must start on the date of substantial completion of the project as determined by the Architect. Provide free maintenance and service during the first 12 months of the guarantee period.

12.5. Scheduled Items:

P – 1 Mop Basin: American Standard 7741.000 Florwell, Zurn Model Z5850-D3-RG-HH-MH-WG or Kohler K-6710-0 acid resisting enameled cast iron corner model floor type service sink, complete with American Standard 8354.112, Zurn Z843M1-XL or T&S Brass B-0665-CR-BSTRK wall mounted faucet with offset shanks and integral stops, levered vandal resistant handles, vacuum breaker, integral check valves, adjustable wall brace, pail hook, 3/4" hose thread on spout, four foot rubber hose and wall bracket for spout hose mounted approximately 4" above the mop sink stainless steel backsplash, Bradley 9933 combination utility shelf/broom holder and utility shelf constructed of 18 ga. 304 stainless steel with 16 ga. stainless steel gussets and hooks, 7745.811 rim guard, strainer for 3" screw connection, 304 stainless steel wall guards and silicone sealant at all points where wall guard meets the basin, wall and floor.

P – 2 Bi-Level Vandal Resistant ADA Indoor Electric Water Cooler with Bottle Filler: Elkay # LVRCTL8WSPRO, bi-level, vandal resistant ADA cooler, refrigerated stainless steel high-capacity lead reduction filtered, wall mounted, electronic bottle filler sensor, ADA and ICC A117.1 compliant with cane apron, stainless steel cabinet and receptor, safety bubbler and 5-year warranty on refrigeration system. It must provide 8 gal/hr. of filtered water at 50°F based on 80ºF inlet water and 90ºF ambient temperature, per ASHRAE 18 testing. Unit must be certified to UL 399 and CAN/CSA C22.2 No. 120 and NSF/ANSI 42, 53, 61 & 372 for lead free compliant design. Unit must be provided with top access filter change wrapper filter from the front of the cooler.

Furnish with 1-1/4" McGuire, Dearborn Brass, Brasscraft or Zurn rough brass p-trap, 17-gauge brass tailpiece and waste with wheel stop valve, concealed Elkay MLP200 or equivalent by Zurn or J.R. Smith bi-level floor mounted support, related floor support plates and base as required for applicable wall construction.

Refer to Architectural plans for mounting heights. Fixtures designated by the Architect as ADA/handicapped must be mounted at current ADA requirements.

Equivalent units by Halsey Taylor or Oasis will be considered.

Provide three (3) extra stock FL10 Water Sentry Plus Replacement Filters for each set of coolers shown on the plans, 6,000-gallon filter tested and certified to NSF 42 and 53 under manufacturer's name to reduce lead, Class 1 particulates and chlorine taste and odor certified to NSF 42, NSF 53, NSF-401 and NSF 372 at greater than stated product flow rate for each bi-level water cooler provided. Upon completion of the project, turn over replacement filters to Architect for transfer to Owner.

P – 3 Tankless Water Heater: Chronomite Invizible CompliantMix Series CMI thermostatic tankless water heater within a fully recessed enclosure with rounded safety corners, concealed pivoting rod hinge and Allen key latch or equivalent. The heater must be provided with 304 stainless steel satin finish and a 40A, NEMA 4x lockable rotary

disconnect. The entire assembly must be suitable for recessed mounting in a CMU or stud wall. Refer to the Architectural plans for required wall type.

The heater must be Model CMI-30L/120, 120V, 1ϕ, 3.6 KW, 49°F temperature rise at 0.50 GPM, complete with operating and safety controls, factory set for 110°F water supply temperature in compliance with current ADA requirements. The water temperature must be controlled by an integral microprocessor and integrated thermostatic mixing valve meeting ASSE 1070, NSF-61 and CSA B125.3-12 requirements. Provide all required accessories required for a Manufacturer recommended installation.

END OF SECTION

SECTION 15700

HEATING, VENTILATING AND AIR CONDITIONING

PART 1. GENERAL

1.1. **General Provisions:** Section 15010 is applicable in full hereto. No materials or products that contain asbestos, formaldehyde, polychlorinated biphenyl (PCB), lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Do not fabricate any duct or install any pipe or equipment until all coordination has been accomplished. Refer to Section 15010 for coordination requirements.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. All prior approvals must be submitted through the Architect.

1.2. **Qualifications:** The Mechanical Contractor must be properly licensed and established at the location of the work and must maintain adequate local service facilities. They must have had previous experience in the satisfactory installation of at least six (6) systems of this type, size, complexity and scope. Each Contractor must have an adequate service facility to provide complete service and maintenance of the facility within 100 miles of the installation.

1.3. **General Scope:** The Mechanical Contractor must furnish and install all equipment, materials and labor required to provide a complete and fully operating mechanical system, even though every item may not be specifically indicated on the drawings or specified.

All advisory provisions listed in the Codes referenced in the Contract Documents must be considered mandatory. In the event of any conflict between applicable Codes, Standards, Listings, Contract Drawings or the Contract Specifications, the most stringent requirements govern. The Contractor must provide, install and comply with whichever imposes the strictest requirement, highest standard and greatest obligation. No exceptions or leniency will be granted. These requirements are intentionally strict to ensure project quality, regulatory compliance, fairness in bidding and protection of the Owner's interests. Non-compliance carries significant risk of financial responsibility, schedule impacts and potential contract default. Bidders and Contractors assume these obligations fully upon participation or award.

Bidders must thoroughly review all contract documents during the bidding period. Any missing information, ambiguities, conflicts, discrepancies, or other issues that could affect accurate pricing must be promptly brought to the Architect's attention in writing before the bid due date. This allows all questions to be clarified, and any necessary corrections made prior to bidding. Failure to identify and resolve such issues before submitting a bid will obligate the Contractor to furnish and complete the work, including any disputed or omitted items, using the specified materials and methods, and the Architect and Engineer's requirements, at no additional cost to the Owner or the Owner's Design Professionals, as directed by the Owner's Design Professionals.

Refer to Section 15010 for additional requirements.

Mechanical items must not be attached to assemblies belonging to other trades. All items must be independently and separately attached to the building's structural system.

Manufacturers or products not specifically named in the specifications require prior approval, which must be requested at least seven (7) days prior to the bid date and submitted through the Architect in accordance with Division 1 and Section 15010.

All penetrations through floors and partitions must be built-in as construction progresses. Where required penetrations in new construction were not built-in as required by the specifications, the Contractor must core drill or saw cut openings sufficiently large enough to accommodate all duct, piping, conduits, firestopping assemblies, related items, etc. without interruption and to allow proper firestopping as required by Code and these specifications.

Prior to installation, all piping must be inspected, upended and thoroughly swabbed clean. All piping must be clean. Any dirt resulting from storage or ground contact must be removed. Any piping installed with dirt must be cleaned.

Architect must select all colors where a choice exists.

1.4. **Contractor Requested Electronic Drawing Files:** Not available.

1.5. **Site Visits:** It is the Contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, the Engineer, any governmental agency or any other entity requires an additional site visit with the Engineer present, the Contractor must pay Zgouvas, Eiring & Associates a re-visit fee of $2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled site visit.

Before requesting the final site visit, the General Contractor must provide the Mechanical Engineer and the Architect with a copy of the Mechanical Engineer's above ceiling corrected punch list. The corrected list must be signed and verified by the Mechanical Subcontractors' respective supervisors and the General Contractor to confirm that all items have been resolved. **If any item marked as corrected/complete is found to be uncorrected/incomplete during the final site visit, the site visit will be considered a failure, and a reinspection fee will be imposed.**

The Contractor is urged to carefully review the extensive requirements of Paragraph Identification and Refrigerant Piping Identification in Section 15010 of the specifications. Note that certain identification is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

1.6. **Record Documents:** Provide in such detail, as is set forth under General and Supplemental Conditions and in Section 15010.

1.7. **Access Panels and Doors in Finished Areas:** Do not locate serviceable items above inaccessible, hard ceilings or in partitions without written approval from the Architect. Coordinate all items locations with the Architectural plans before installing any items. Furnish access panels and doors to the General Contractor for installation wherever required for access to any items requiring maintenance.

Access panels/doors in finished areas or areas exposed to view must be suitable for wall or ceiling finish involved, 24" x 24" unless otherwise indicated or as required to permit removal of equipment and provide acceptable maintenance access. Access panels and doors must be fire rated where rated assemblies are penetrated.

Access panels and doors must be manufactured by Milcor, Elmdor, Zurn, Mifab or approved equivalent. The Architect must approve the use of and type of all panels and doors to be installed in areas that are exposed to view or in finished areas.

Exposed access panels and doors must be factory cleaned and primed for painting in the field. Colors, materials and methods must be as directed by the Architect. Refer to Architectural Section, Painting, for additional information.

For detention and similar institutional type facilities, refer to Section 1122 for type of access panels/doors required.

Refer to Section 15010, Part Access Panels and Doors for additional requirements.

1.8. **Access Panels/Doors for Miscellaneous Areas:** Refer to Section 15010 and above for access doors required for equipment, valves, etc. in exposed/finished locations.

Provide double wall access door in the side of the duct for each fire damper, motorized damper, on each side of duct mounted coils and duct heaters, smoke detectors and elsewhere indicated, specified or required for proper maintenance. Size and position to provide maximum access to all items with minimum 12”x12”.

Typical doors must be double metal faced, 22 ga. steel door panels and 22 ga. frame, internally insulated same as duct (1” minimum) fiberglass insulation, neoprene gasket seal and full length plated steel piano hinges with cam lock. Provide access panels/doors with cam locks only, where hinged access panels/doors cannot be completely opened without obstruction. When access panels/doors are provided with cam locks only, they must be provided with factory installed safety chain. Access panels/doors must be rated for the anticipated duct pressure, plus 1”. All access doors located outside must be airtight and weatherproof.

Hinged access doors must be Ruskin Series ADH22. Removable access doors/panels with cam locks must be Ruskin Series ADC22 with minimum of two cam locks and factory installed safety chain. Nailor Industries Model 08SCL/Model 08SH, Kees ADH/ADC, Greenheck HAD or Pottorff Series HAD/CAD will be acceptable.

For ducts 10” round and smaller, access doors must be flush mounted, flat oval, 1” insulated, low leakage, 20 ga. steel door panels and frame, except with two large hand knobs or cam locks with factory installed safety chain and equivalent to Ruskin Model ADR1 for round ducts or equivalent by Nailor, Greenheck, Kees or Pottorff.

Hinged access doors for round ductwork over 10” must be flush mounted, flat oval, 1” insulated, low leakage, 20 ga. steel door panels and frame, except with two large hand knobs or cam locks with factory installed safety chain and equivalent to Ruskin Model ADR2 for round ducts 12” round up to and including 16” round duct. Nailor

Series 0800, Pottorff Series DMR, Greenheck RAD or equivalent by Kees will be acceptable.

Refer to other sections for access doors required in kitchen hood exhaust ducts, moisture-laden ductwork, medium/high pressure, high velocity ductwork, etc.

Refer to Section 15010 for additional access door/panel requirements including Section 15010, Part Identification for identification requirements.

1.9. **Buy American:** Manufacturers of all products, materials, equipment, components and systems specified in Division 15 must comply with the Buy American Act and the American Recovery and Reinvestment Act of 2009 (ARRA) and 2025 Code of Alabama Title 39 - Public Works, Chapter 3 - Use of Domestic Products and Resident Workmen for Public Works, Improvements, Etc.

Exceptions to these requirements will be permitted only where the specified items are proven to be unavailable from domestic U.S. sources. Examples of items that may qualify for exception include variable refrigerant flow (VRF) equipment products. Any request for exception must be submitted in writing to the Architect/Engineer for prior approval and must include supporting documentation demonstrating that no suitable domestic product is available. Where three (3) or more U.S. manufacturers can furnish products that meet or exceed the requirements of the Contract Documents, only domestic (U.S. manufactured) products must be provided.

During the submittal phase, the respective manufacturer must provide a conformance letter on the manufacturer's official company letterhead. The letter must be signed by an Officer of the Manufacturer's Board of Directors and must explicitly certify full compliance with the Buy American Act and ARRA. Failure to include this conformance letter with the submittal will result in immediate rejection of the submittal without review.

1.10. **Miscellaneous:** Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

The Contractor must carefully examine the contract documents during the bidding phase. Any missing information, clarifications, etc. in the contract documents that is required to obtain accurate pricing must be brought to the attention of the Architect, **prior to bid date**, so all may be clarified and/or corrected. Failure to identify and resolve any issue prior to bid must require the Contractor to provide said items, complete, without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods specified by and as directed by, the Owner's Design Professionals.

Refer to Section 15010 for additional requirements.

1.11. **Identification:** The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits**.** There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory.

1.12. **Painting and Colors:** Furnish to the Architect, color cards for standard and premium colors available. **The Architect must select color where choices exist**. Refer to the Architectural Painting Section of the specifications for additional requirements.

1.13. **Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts and clamps on Unistrut assemblies are not required to be painted or coated. All Unistrut with coatings that are cut to size as required must also have their ends painted wit two coats black, enamel, rust resistant paint. No bare galvanized is allowed unless specified otherwise.

All damaged or rusted steel pipe and all hangers, Unistrut and other support assemblies must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See specification Section 15010, Part Identification for detailed requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Refer to Section 15010 for additional requirements.

1.14. **Safety Provisions:** Provide covers or guards on all hot, moving and projecting items that may be deemed by the Engineer, Architect or Owner to be a hazard to occupants of the building or to service personnel. Provide full size expanded metal grilles over all exhaust/relief air assemblies on all packaged equipment to protect against any intrusion to motorized dampers, gravity backdraft dampers, etc.

1.15. **Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.

1.16. **Submittals:** Refer to Section 15010 for **strict requirements** and, especially as it applies to format, project cost constraints, addendums and Value Engineering (VE) items.

Only ONE complete submittal will be accepted. Providing submittals piecemeal is not allowed. If a partial or incomplete submittal is provided, it will be cause for immediate rejection.

1.17. **Firestopping:** Refer to Section 15010, Part 2, “Miscellaneous Requirements to be Coordinated with Other Trades”, Paragraph “Firestopping”. **Note that Division 15 firestopping specifications require firestopping of all penetrations regardless of wall/ceiling/floor construction. Refer to Division 1 regarding additional requirements.** Where there is a conflict between Division 1 specifications and Division 15 specifications, the most stringent requirements must govern, are applicable and must be provided.

1.18. **Service, Charges, Lubrication, Filters, etc.**: During the guarantee period, the Contractor must furnish all labor, materials, tools and equipment necessary to provide comprehensive service and preventive maintenance for all equipment and systems installed under this Contract, in accordance with the manufacturer’s recommendations, applicable industry standards (such as ASHRAE guidelines) and the reviewed Operating and Maintenance manuals.

As a minimum, quarterly service calls must be performed by qualified, factory-trained technicians, with a detailed written service report (including checklists, findings, measurements and corrective actions taken) must be submitted to the Owner and the Architect after each visit. Failure to submit the required detailed service report to the Owner and the Architect after any quarterly service visit will be considered as the specified maintenance not having been provided. In such cases, the Contractor must re-perform the complete quarterly service as specified, at no additional cost to the Owner and subsequently extend the specified warranty an additional quarter. The final quarterly service call must be scheduled no later than two weeks prior to the year-end site visit. Each quarterly service visit must include, but not be limited to, the following:

- Changing of all replaceable filters.
- Cleaning of all washable filters.
- Lubrication of all motors, bearings and moving parts in accordance with manufacturer recommendations.
- Calibration and adjustment of all controls, thermostats, valves, dampers and associated equipment.
- Inspection for refrigerant leaks, verification of charge levels and adjustment to maintain the manufacturer’s specified full operating charge.
- Changing of all drive belts, pulleys, drives and other consumable items as required per manufacturer’s recommended schedule.
- Thorough cleaning of evaporator and condenser coils, condensate drains and pans, fans and equipment interiors/exteriors.
- Inspection and tightening of all electrical connections, testing of safety controls and devices and verification of proper system operation (including checks for abnormal noise, vibration, or performance issues).
- Recording of key operating parameters (voltages, amperages, pressures, temperatures, etc.) to confirm system efficiency and compliance with design conditions.

Any deficiencies identified during these services must be corrected promptly at no additional cost to the Owner. All maintenance activities must be documented and coordinated with the Owner to minimize disruption. Provide the Owner and the Architect a complete report of all quarterly maintenance provided.

1.19. **<u>Operating and Maintenance Manuals</u>: Two weeks before the final site visit**, furnish three complete sets of operating and maintenance instructions, bound in hard cover, indexed and tabbed.

The Contractor must also provide this information in digital Adobe Acrobat PDF format, on a CD-R CD. The PDF file must be provided with an embedded index for each specified item. The index must appear in the left hand window of the opened document so that the Owner or his maintenance personnel can “click” on the indexed item and move immediately to that specific item.

Minimum requirements for the Operating and Maintenance Manuals must be as follows:

a. The first page of the bound instructions must be a listing of:

    1. The Owner/Project Title.
    2. The Architect and Architect’s Job Number.
    3. The Engineer and Engineer’s Job Number (Found in the Engineer’s Logo in the Bottom Right Corner of the Mechanical Plans and in the footer of this specification section).
    4. The General Contractor and Contact Information.
    5. The Mechanical Subcontractor and Contact Information.

b. Second page must be a Table of Contents listing all products in the order which appear in the specifications and label the tab accordingly. Include all equipment using nomenclature shown on the Mechanical plans, UV-C lights and similar devices, motorized dampers, etc.
c. The third page must be a summary page that lists each item with its respective warranty, including all extended warranties.
d. All warranty card information must be filled in by the Mechanical Contractor; Serial numbers, Model Numbers, etc. all as required for proper warranty registration. The warranty registration date must be the date of substantial completion as determined by the Architect.
e. Provide copies of all filled in warranty cards.
f. Provide a local source of supply for parts and replacement, including names and telephone numbers of parts suppliers.
g. Provide a general maintenance summary section. Section must be a list of each piece of equipment or device using the designations as shown on the plans and the routine maintenance procedures based on the respective manufacturer’s recommended intervals. As a minimum, maintenance must be grouped and individually tabbed to indicate maintenance operations required:

    1. Once a month
    2. Quarterly
    3. Once every six months
    4. Once a year

h. Provide copy of the results of all specified tests.
i. Copy of Test and Balance Report.
j. Copies of all the Mechanical Engineer’s Site Visit Reports including Contractor’s written response that items listed were corrected.
k. Copies of all certificates of all site visits, comments and approvals from all Governing Authorities.

l. Provide copy of all Division 15 Specifications except Section 15400.
m. Provide a copy of all shop drawings/submittals.
n. Provide drawings of system control and wiring diagrams, condensed operating instructions, specified sequences of operation. Include hard copy in binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical room in an optimally viewed location.
o. Provide record drawings of the Mechanical drawings, in hard copy and PDF format on CD. Refer to Section 15010, Part 1, General, Paragraph, Record Drawings for detailed requirements. Record drawings must also indicate all valve numbers from the specified valve chart.

1.20. **Warranty:** Guarantee work as set forth in Section 15010 and Division 1. Guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of substantial completion of the project, as determined by the Architect and unless specified otherwise a 5-year warranty on all air conditioning compressors. Provide free maintenance and service during the guarantee period to **include furnishing and replacing of filters and the cleaning of all washable filters.** Refer to other parts for additional requirements and extended warranty requirements.

PART 2. ELECTRICAL WORK AND EQUIPMENT

2.1. **Power:** All power wiring required for installation of equipment is specified under the Electrical Division. Electrical equipment must be compatible with the electrical power shown on electrical drawings. **The Contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans and at the project site, prior to ordering equipment.**

2.2. **Motors:** All furnished motors must be new, of current manufacture and designed, manufactured and tested in strict accordance with the latest applicable standards of NEMA, ANSI, IEEE, ASTM, UL, CSA and the National Electrical Code (NEC/NFPA 70). As a minimum, all motors must conform to the current applicable sections of NEMA Standard MG 1.

All motor ratings, efficiencies, torque, horsepower, service factor, temperature rise, bearing life and performance characteristics specified herein must be fully achieved at a base frequency of 60 Hz or lower. Motors must not rely on operation above 60 Hz to meet any specified performance criteria, nor shall the capability to operate above 60 Hz be used to satisfy the minimum requirements of this Section. This requirement applies to all motors, including those intended for use with variable frequency drives (VFDs).

Motors must meet or exceed the full-load efficiency values of the Consortium for Energy Efficiency (CEE) Premium Efficiency™ program (or equivalent NEMA Premium efficiency levels). All motors 1 HP and larger must be premium efficiency type. All motors with a scheduled capacity of less than 1 HP must be electronically commutated motor (ECM) type as required by ASHRAE 90.1 and must achieve a minimum motor efficiency of 70% when rated in accordance with DOE 10 CFR 431.Premium-efficiency motors must be warranted by the manufacturer for a minimum of 36 months from the date of Substantial Completion of the project, as determined by the Architect.

All motors must be listed by Underwriters Laboratories (UL), Canadian Standards Association (CSA), or other Nationally Recognized Testing Laboratories (NRTL) as applicable and must be suitable for installation and operation in accordance with the

requirements of the NEC. Motors must be wound for the specified voltage, phase and frequency. Unless otherwise indicated or specified, motors must have a minimum 1.5 service factor, 1750 RPM speed, open drip-proof (ODP) construction and Class F insulation with Class B temperature rise.

Bearings must be heavy-duty, grease-lubricated ball bearings with a minimum L10 (B-10) rated fatigue life of 150,000 hours for direct-coupled applications and 50,000 hours for belted applications. Belted bearing life ratings must be calculated in accordance with NEMA MG 1 based on the actual radial loads and pulley sizes. Motor loading must not exceed 100% of the motor's nominal horsepower rating.

Routine factory testing must be performed in accordance with IEEE Standard 112, Method B (latest edition) and as described in NEMA MG 1, Article 12.55.

Where shown, specified, or required for the application, furnish increment-wound motors suitable for two-step starting. All motors must be provided with properly sized overload protection and phase loss protection on all three legs. Motors must not be operated until the correct overload elements or settings are installed in the starters. Replacement or adjustment of overload elements to match the motors actually furnished must be included in the work of this Section.

All motors serving outdoor equipment or equipment exposed to weather must be totally enclosed fan-cooled (TEFC) type while still meeting or exceeding all other requirements stated herein.

Approved manufacturers: Regal Rexnord Corporation, Emerson Electric, Franklin Electric, AMETEK, Inc., Baldor Electric Company/ABB, Nidec Corporation, Siemens AG, or ABB Group.

2.3. **Fusing:** Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.

2.4. **Motor Starters:** All motor starters furnished under this Section must be new, of current manufacture and designed, manufactured and tested in strict accordance with the latest applicable standards of NEMA ICS 2, UL 508A and the National Electrical Code (NEC/NFPA 70). As a minimum, all motor starters must conform to the current applicable sections of NEMA ICS 2.

Motor starters must be furnished under this Section. Installation of field-mounted starters is specified under the Electrical Division, except for those that are specified to be factory-assembled with the equipment.

Starters must be listed by Underwriters Laboratories (UL), Canadian Standards Association (CSA), or other Nationally Recognized Testing Laboratories (NRTL) as applicable. Where required for interlocks or control circuits, starters must include a built-in step-down control power transformer.

Motors intended for use with variable frequency drives (VFDs) must be designed and rated in accordance with NEMA MG 1, Part 30.

All motor starters must be wall-mounted at an accessible height from the floor and must be readily accessible for operation and maintenance. Mounting on equipment or Unistrut-type frames is not acceptable.

Provide for each motor or group of motors requiring a single point of control (and not controlled from a motor control center), a suitable motor controller complete with all devices necessary to function as specified for the respective motor(s).

Provide overload protection in each ungrounded conductor for every motor 1/8 HP and larger. Overload protection must be manual reset type unless otherwise indicated. The overload protective device must be integral with the motor starter or controller.

Unless otherwise indicated, furnish pilot lights on all remote starters. Provide "Hand-Off-Auto" selector switches and required auxiliary contacts on all starters.

Auxiliary control devices connected into the control circuit must not bypass any safety controls (motor overload protective devices, high-pressure cutouts, low-pressure cutouts, or other safety devices).

Motor starters must not be operated until the correct overload elements or settings are installed in the starters. Replacement or adjustment of overload elements to match the motors actually furnished must be included in the work of this Section.

Approved manufacturers are GE Vernova, Siemens AG, Schneider Electric, ABB Group, Rockwell Automation, Eaton Corporation, Danfoss A/S, Yaskawa Electric Corporation, Emerson Electric, or Fuji Electric.

2.5. **Equipment Protection**: All fan motors, indoor units, outdoor units, condensing units, packaged units and associated equipment must be provided with surge protection and phase/voltage protection. All surge and phase/voltage protection devices must be new, of current manufacture and designed, manufactured and tested in strict accordance with the latest applicable standards of UL 1449 (for surge protective devices), ANSI/IEEE C62.41, UL, CSA and the National Electrical Code (NEC/NFPA 70). This protection must, at a minimum, safeguard the equipment against:

- Voltage unbalance
- Overvoltage
- Undervoltage
- Phase loss
- Phase reversal
- Incorrect phase sequencing
- Rapid short cycling.

Where available from the equipment manufacturer, the specified protection must be factory-installed by the equipment manufacturer. When such protection is not provided by the equipment manufacturer, the Contractor must furnish and install the following:

- For all three-phase equipment: ICM Controls Model 450A Plus+ or approved equivalent.
- For all single-phase equipment 1/8 HP and larger: ICM Controls Model ICM 492 or approved equivalent.

The Contractor must coordinate with the Owner's maintenance personnel and properly program all adjustable and programmable settings in the protection devices according to the Owner's operational requirements and within the device's capabilities.

Phase and voltage protection is not required on equipment controlled by a variable frequency drive (VFD) when the specified protection functions are inherent within the VFD controller furnished.

2.6. **Controls:** All HVAC controls cabling and wiring must be plenum rated and in EMT conduit (no "whips") or on J-hooks. Above accessible lay-in ceilings, control wiring must be installed on J-Hook assemblies. Above all hard, inaccessible ceilings, in all mechanical rooms and in areas with exposed structure (no ceilings), controls wiring must be in conduit. Do not attach any wiring, cabling or conduits to refrigerant piping.

Do not route control wiring through sleeves containing piping. Do not route any control wiring through or within any ductwork. **All wiring penetrating any exterior wall, interior partition, floor and similar construction must be in conduit with protective grommets on the conduit ends. HVAC outdoor control wiring must terminate above the ceiling in an accessible location. Through base control wiring/conduit is not allowed.**

EMT control conduit must be as specified in the Electrical Division of the specifications and/or as shown on electrical drawings. Minimum HVAC Controls conduit size must be 3/4" in size. All control conduit, power, relays, contactors, transformers, wiring, etc., required for a complete functional system as specified, shown on the plans, or as required to accomplish the specified sequences of operation, which is not shown or specified by the Electrical Division, must be furnished and installed by the HVAC Controls Contractor. This must include all power, interlock control wiring between the various components of the heating, ventilating and air conditioning system, lighting interlocks and all smoke detection system electrical wiring.

Electrical work performed under this Section must conform to requirements set forth in the Electrical Division(s) of the specifications. All wiring must be in accordance with the National Electrical Code and all State and local codes. Coordinate all requirements with the Electrical Sub-Contractor prior to bid and provide all as required.

All thermostat and humidistat boxes must be mounted 46" A.F.F. to the center of the box (ADA height). Where wall mounted CO_2 Sensors are indicated, they must be mounted 58" A.F.F to the center of the box. All wall mounted devices must be provided with hinged, locking metal covers with rounded edges. All equipment requiring wall mounted devices that use occupancy sensors must be provided with clear plastic hinged locking covers.

Provide drawings of system control and wiring diagrams, condensed operating instructions and specified sequences of operation. Include hard copy in Operating and Maintenance Manuals binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical room in an optimally viewed location.

All work must be provided by an approved, independent HVAC Controls Contractor whose primary business is the installation and servicing of HVAC controls systems.

2.7. **Controls and Instrumentation Cable:** Instrumentation cable must be minimum AWG as recommended by the equipment Manufacturer or the HVAC controls system Manufacturer. The most stringent cable requirement must be provided. All wiring, cabling, conduit, connections, etc., must be plenum rated and rated for use at temperatures and conditions expected in the location of mounting. Do not attach any wiring, cabling or conduits to refrigerant piping.

2.8. **Wiring Diagrams:** Furnish to the Electrical Contractor for the specific makes and models of electric-motor operating equipment to be installed. **The Contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans and at the project site, prior to ordering equipment.**

2.9. **Modifications:** The cost of any modifications of the electrical power wiring, breakers and/or control wiring conduit, etc. that is required for any items specified in Section 15700, or controls having electrical power requirements differing from those shown on the electrical drawings and/or as specified, must be the responsibility of the Mechanical Contractor.

PART 3. VIBRATION AND NOISE CONTROL

3.1. **General:** Elimination of objectionable vibration and noise is the responsibility of the Contractor, who must provide all foundations, spring isolators, flexible connections, air chambers, curbs, etc. required thereby. Pay special attention to vibration problems at year end site visit and correct all deficiencies noted.

PART 4. TESTING, START-UP, BALANCING, ETC.

4.1. **General:** Conduct tests upon completion of the heating, ventilation and air conditioning installations and at times as designated by the Architect. Furnish written reports to the Architect of all tests results. Provide copies of all test results in the Bound and Framed Instructions specified hereinbefore. Furnish all necessary personnel, test instruments, power, fuel, etc., as required to complete the specified requirements.

4.2. **Refrigerant Piping Testing:** The Mechanical Contractor must provide two tests for the refrigerant piping installation. The medium used for pressure testing the refrigerant system must be oxygen-free nitrogen, helium or argon. Oxygen, air, combustible gases and mixtures containing such gases must not be used as a test medium. Systems erected on the premises with tubing not exceeding 5/8 inch outside diameter must be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

The refrigerant piping system must be tested as a whole, or separate tests must be conducted for the low-pressure side and high-pressure side of the piping system. The refrigerant piping system must be tested in accordance with both of the following methods:

Test 1: The system must be pressurized for a period of not less than 60 minutes to not less than the lower of the design pressures or the setting of the pressure relief device(s). The design pressures for testing must be the pressure listed on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel or other system component with a nameplate. Additional test gas must not be added to

the system after the start of the pressure test. The system must not show loss of pressure on the test pressure measuring device during the pressure test for a minimum 24 hours.

Test 2: A vacuum of 500 microns must be achieved. After achieving a vacuum, the system must be isolated from the vacuum pump. The system pressure must not rise above 1,500 microns for a period of not less than 60 minutes.

Where using refrigerant as a test medium as specified above, the test pressure must be not less than the saturation dew point pressure at 77°F.

As required by IMC 1110.8, the installation Contractor must issue on his company letterhead, to the Local Code Official and the Authority Having Jurisdiction, a certificate of testing for all systems containing 55 pounds or more of refrigerant. The certificate must give the unit number as shown on the plans, the test date, name of the refrigerant, test medium and the field test pressure applied to the high pressure side and the low-pressure side of the system. The certification of the test must be signed by the installation Contractor.

4.3. **Ductwork for Systems Less Than 2,000 CFM:** The Mechanical Contractor must test all supply, return, relief and outside air, exhaust ducts, plenums and casings and make substantially airtight before covering with external insulation or concealing masonry. Substantially airtight must be construed to mean that no air leakage is noticeable to the senses of touch or sound at joints.

4.4. **Ductwork for Systems 2,000 CFM or Greater:** The Mechanical Contractor must test all supply, return, relief and outside air, exhaust ducts, plenums and casings and make airtight before covering with external insulation or concealing in masonry. Test supply ductwork under the positive pressure for the respective system. Test return and exhaust ducts, plenum and casing under a positive pressure of 0.75“WG. The maximum allowable leakage must be 10%. Vacuum clean ducts, plenums, casings and coils. Check that flexible connections are installed in folds (not pulled tight) and not transmitting vibration.

4.5. **Testing of Smoke Detectors:** The Mechanical Contractor must attend the testing of all smoke detectors which are a part of the mechanical system. A smoke machine is required to be used for testing the smoke detectors. Anything other than a smoke machine is not allowed. Coordinate the provision of the smoke machine three days prior to the day of testing with the Electrical/Fire Alarm Contractors and provide as required. **If a smoke machine is not present at the time of testing, DCM and/or the Engineer, as applicable, will cancel on-site, the site visit and a reinspection fee imposed, with all costs of the re-inspection to be borne by the Contractor.**

The Mechanical Contractor must provide an access door/panel, watertight where required, adjacent to each smoke detector to allow for maintenance and visual inspection. Access panels must be as specified hereinbefore.

4.6. **Performance Tests:** After cleaning, balancing and testing are completed as specified, test each system as a whole to see that all items perform as integral parts of the system and that temperatures and conditions are evenly controlled throughout the building. Verify all sequences of operation and submit report. Make corrections and adjustments as necessary to produce the indicated conditions.

All work must be performed by an independent test and balancing agency whose primary business is the testing and balancing of heating and air conditioning systems and its related components. The Test and Balancing Contractor must hold a current NEBB or AABC certification. Proof of certification must be provided at the submittal stage.

The test must cover a period of not less than three days and must demonstrate that the entire system is functioning properly. Provide the following:

Date of testing, space temperature and humidity, outdoor air temperature (DB & WB), air temperature entering condenser coil; and load amperes for all motors. Also, provide CFM readings at all grilles, registers and diffusers and entering and leaving air temperatures at each evaporator coil.

Provide a typed list indicating job setting of all automatic controls. Include settings of thermostats, humidity controls, CO_2 sensors, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls and other similar items. Tabulate to show type of control, location, setting and function. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system.

After building is occupied, adjust as requested by Owner.

4.7. **Balancing:** The Testing and Balancing Contractor must check airflow at all supply air, return air and exhaust air devices, all diffusers and outside air intakes with a recently calibrated direct-reading velocity instrument. Adjust systems to deliver, supply air, return air, outside air and exhaust air quantities to within 10 percent of the indicated amounts. Provide instruments and otherwise assist the Architect in checking balancing at final site visit.

4.8. **Settings:** Contractor must permanently mark the settings of all valves, dampers and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it must permit the closing and reopening of the device to its balanced position.

4.9. **Unit Protection Verification:** The Test and Balance Contractor, with cooperation from the Mechanical Contractor, must verify that all phase protection specified has been installed where specified and installed per the Manufacturer's requirements. The verification of this requirement must be furnished in tabular form with findings included in the test and balance report. The summary must list all equipment specified to have the protection, verification that the device is installed per the Manufacturer's recommendation and has been programmed to the Owner's requirements.

4.10. **Test Data:** The Testing and Balancing Contractor must submit typewritten report as specified above. Include schedules of readings taken during the testing and balancing operations and a line diagram or plan of the system indicating specified quantities and final balanced quantities **seven (7) days prior to final site visit**. **The Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if the test and balance report has not been submitted as specified. Failure to comply with this provision will be cause for cancellation of the site visit and a reinspection fee imposed, with all costs of the re-inspection to be**

borne by the Contractor. No final site visit must be made without this data. Report the required or specified reading, the first reading taken and final balanced reading for the following items:

Fans: Size, type, fan motor speed in rpm, outlet velocity in fpm, static pressure inches water, air quantity in cfm and motor load in amperes.

Air Handling Equipment: Size, type, fan speed in rpm, outlet velocity in fpm, external static pressure inches water, total static pressure inches water, air quantity cfm and motor load in amperes.

All Air Outlets and Inlets: Size, velocity in fpm and air quantity in cfm.

Coils: CFM, size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.

Refrigerant Hot Gas Reheat Coils: The Mechanical Contractor, with assistance from the Testing and Balancing Contractor, must adjust the humidistat so that the hot gas reheat coil valve opens. Verify modulation of the coil valve. Provide coil size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.

Ducts: Size, velocity in fpm and air quantity in cfm.

Heat Pumps Auxiliary Heaters: Provide heater capacity (KW), amperage loads and number of stages of heat.

Air Cooled Condenser Sections of All Outdoor Units: Air temperature entering condenser coil; refrigerant suction temperature and pressure at compressor and evaporator coil; condensing temperature and pressure and load amperes for all motors.

4.11. **Control Settings:** In cooperation with the HVAC Controls Contractor and/or the Mechanical Contractor as required, must calibrate, adjust and verify sequences of operation and the control systems, including the refrigerant hot gas reheat coils, to show that the requirements of these specifications have been met.

Verify all specified sequences of operation and provide report.

Provide a tabulation of setting on all controls indicating set point and throttling range, etc. after controls and systems have been finally adjusted. Include settings on safety controls and cutouts. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system. Provide a typed list indicating job setting of all automatic controls. Include settings of thermostats, humidity controls, CO_2 sensors, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls and other similar items. Tabulate to show type of control, location, setting and function. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system.

4.12. **Seasonal Adjustments:** At the beginning of the first heating season adjust and balance operating phases and repeat at the beginning of the first cooling season or vice versa as requested by the Architect or Owner.

4.13. **Notification:** Notify the Architect one week prior to all testing. The Contractor must provide all testing equipment and must furnish written reports to Architect of all tests results. Additionally, provide copies in the Bound and Framed Instructions specified hereinbefore.

PART 5. SHEET METAL DUCT WORK (LOW VELOCITY 2" S.P.)

5.1. **General Scope:** Provide as shown and as required for the air conditioning, heating and ventilation systems. Make changes in dimensions, offsets or crossovers as necessary to clear piping, lights and structural members and to maintain scheduled headroom. Provide all accessories required. Refer to architectural drawings and specifications.

All exposed internally lined or double wall ductwork must be provided with paint grip finish or must be primed in the field to receive paint. Refer to Architectural section "Painting" for painting of exposed ductwork. In case of the absence of painting requirements in the aforementioned Specification Section(s), the interior and exterior of ductwork visible from any finished space must be cleaned, primed and painted with two coats of paint as directed by the Architect.

Ductwork visible through all grilles, registers, diffusers, ceilings, etc. must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

5.2. **Protection of Interior of Duct from Debris:** ALL open portions of ductwork must be covered with a self-adhesive film or airtight sheet metal caps to prevent the intrusion of contaminates. All duct taps, duct take-offs, etc., must be protected immediately after the tap, take-off, etc. has been fabricated in the field. When sections of sheet metal are delivered to the facility for fabrication in the field, which cannot be protected with the specified material, the sheet metal must be covered with Visqueen. Prior to erecting the same, ductwork must be manually cleaned to remove all dust, dirt and construction debris. All ductwork must be erected clean.

After each section of ductwork is erected, immediately protect all openings as specified herein before. In effect, there must be no ductwork opening that is exposed to the ambient air. The material must be a minimum 3-mil thickness and have a minimum tensile strength of 10 psi. It must be UV resistant, waterproof and recyclable. Material must be DuroDyne Dyn-O-Wrap or approved equivalent. **Any ductwork discovered to be unprotected as specified is subject to immediate rejection for use on this project.**

5.3. **Protection of Interior Ductwork and Equipment When Any Air Moving Equipment is Operating During Construction and Prior to Owner's Occupancy:** It is the Mechanical Contractor's responsibility to ensure the inside of each air handling unit and associated air distribution system is kept clean and not allow construction dust to infiltrate the system. Should the system become contaminated as determined by Architect, Engineer or Owner, the Mechanical Contractor must be responsible for cleaning.

If air moving equipment must be used during construction, temporary filtration media with a Minimum Efficiency Reporting Value (MERV) of 8, as determined by ASHRAE 52.2 and must be installed at each return air grille, return air register, exhaust grille, exhaust register and unit return air inlet.

The General Contractor must make a written request to the Architect for permission to temporarily operate any equipment during construction. The request must be made a minimum of seven (7) days prior to the desired date of the interruption. Do not operate any equipment without the Architect's written approval.

5.4. **Sizes:** Take measurements at job and fit work into available space. Report to the Architect any unworkable conditions encountered and alter layout or duct sizes as directed without additional cost to the Owner or the Owner's Project Design Professionals. Unless otherwise approved, conform to dimensions indicated. Duct dimensions shown indicate NET FREE AREA after installation of duct liner; increase sizes indicated to allow, therefore.

5.5. **Sheet Metal:** ARMCO, or equal, prime quality, G-90 galvanized sheet steel conforming to ASTM A653. Unless indicated otherwise on the plans, gauges must be as recommended in SMACNA "Duct Construction Standards", 4th Edition, 2020 **but in no case must be less than listed in the table below for the respective duct largest dimension or diameter**. **No 26 gauge ductwork is allowed.**

4 to 18 inches	24 ga.
19 to 30 inches	22 ga.

5.6. **Acceptable Manufacturers:** McGill Airflow, Southeastern Metals (SEMCO), Hamlin Sheet Metal, ECCO Manufacturing, Conklin, Spiral Systems Inc, Hranec or Eastern Sheet Metal, Inc.

5.7. **General Fabrication:** Construct and erect in a skillful manner, meeting requirement of the current SMACNA "HVAC Duct Construction Standards", 4th Edition, 2020 for 2" static pressure unless noted or specified otherwise. **Where conflicts occur between current SMACNA requirements and the contract drawings or these specifications, the most stringent requirements must apply. In general, the heaviest gauge metal and the strictest installation/fabrication methods must be provided.**

Form straight and smooth on the inside, with joints neatly finished. Make up in sections of such length that mechanic can reach through the open end to seal insulation at previous joint. Assemble and anchor to be completely free from vibration and drumming under all conditions of operation.

Make takeoffs at round and rectangular ducts with factory fabricated round-to-rectangular and rectangular-to-round transitions as applicable.

All rectangular ductwork traverse joints over 23" must be made with all metal DuctMate joints system manufactured by DuctMate Industries, Inc., Quikduc Transverse Duct Connection Systems or Duro Dyne Dyn-O-Mate. DuctMate system must be installed in strict accordance with current SMACNA and Manufacturer's recommendations and instructions.

Where ductwork penetrates non-rated partitions above the ceiling or insulation support/attic air barriers, draft stops and similar partitions, the openings must be sized as required for duct and insulation, plus 2" and sealed as specified below. Provide duct supports as specified within 12" of each side of the partition penetrated. **DO NOT ALLOW DUCT TO REST ON PARTITION WALLS**.

All penetrations of new floors and partitions are required to be built-in as work progresses. All penetrations of new construction that were not built-in as required by these specifications and all new penetrations of existing floors, walls and partitions must be core drilled or sawcut large enough to allow all conduits, piping, ductwork, firestopping assemblies, etc., to continue uninterrupted and to provide proper firestopping of the penetration as required to install new items as shown and/or specified.

Where duct penetration occurs at non-rated assemblies, the gap around the penetration must be 2". Any penetration larger than 2" must be neatly filled to the 2" mark using the same materials used to construct the penetrated assembly. Thereafter, any penetration between the assembly and the duct must be filled with fire resistant mineral wool insulation and sealed on both sides of the assembly with a fire stopping compound to prevent the passage of smoke and fire. After sealing, provide a 2" wide, 16 gauge galvanized steel closure plate around the penetration on each side of the assembly. Closure plates must fit snugly to the duct and must be secured to the wall. All ductwork and closure plates that are exposed to view in finished areas must be primed and painted as directed by the Architect. **Do not install closure plates until Engineer or Architect has verified the proper sealing of the penetration. If closure plates are installed prior to the Architect's or Engineer's inspection, the contractor must remove them to verify proper sealing as specified above.**

Provide additional supports to raise ductwork off any metallic item above the ceiling. Wherever any bare metallic piping, conduits and metallic structural members are in contact with externally insulated duct or bare sheet metal duct, there must be dielectric separation provided. The Contractor must provide 3/4" thickness, **unslit** AP Armaflex insulation of sufficient inside tubular diameter to snuggly and completely cover the respective metallic item. The insulation must extend the full length of the affected area plus 6" on both sides. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" in this division for AP Armaflex material specification. The use of Rubatex insulation between piping and the ductwork will only be allowed when providing the proper supports is not an option.

Refer to Paragraph "Hangers and Supports" in this Section 15700 for additional requirements.

5.8. **Cross-Joints, Seams, Stiffening and Sealing:** Join and stiffen with combination of joint types, connectors and structural angles that are a minimum of two gauges heavier than the duct for the sizes shown as recommended in current SMACNA "HVAC Duct Construction Standards", 4th Edition, 2020. **Cross break all flat areas over 35 inches wide.** Install internal ends of slip joints in the direction of flow.

All transverse joints with long dimension over 23" must be made with all metal DuctMate joints system manufactured by DuctMate Industries, Inc., Quikduc Transverse Duct Connection Systems or Dyn-O-Mate with roll-formed flanges, corner pieces, gasket and cleat. The system used must be installed in strict accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, 4th Edition (2020) and Manufacturer's recommendations and instructions.

Make all cross joints and all branch, grille and diffuser take-offs, except DuctMate joints, air tight by applying fibrated, low VOC, LEED v4 (UL 2818) compliant duct sealer. Sealer must meet and pass UL 181B-M, ASTM G21 (fungus resistant), ASTM D5590, NFPA 90A/90B and EPA/NSF/ANSI regulations. Sealer must meet the requirements for the pressure classification of the ductwork installed.

The sealant must be Hardcast Iron Grip 601, Duro Dyne Duro Seal EDS-RS, Design Polymerics DP1020 or United McGill Uni-Mastic 181.

5.9. **Branch Ducts to Diffusers:** Round runouts to diffusers, up to and including 14" round, must be 24 ga., G-60 galvanized, DuctMate Series GreenSeam +Snap Lock pipe with factory sealed longitudinal and transverse gaskets. Gasket for GreenSeam +Snap Lock pipe must contain antioxidants, fungicides, adhesion promoters, zero VOCs and must meet or exceed ASTM E-84 test requirements. 16" round to 20" round runouts must be 24 ga. and equal to DuctMate Series Reeves Lock Pipe, G-60 galvanized pipe.

5.10. **Branch Duct Take-Off:** Provide at all points where branch ducts take off from trunks and where ducts divide. Refer to details on the drawings. Damper must be minimum 22 Ga., G-90 Galvanized steel with 2" build out. Body must be a minimum of 24 Ga., G-90, galvanized steel with 4" W.G. construction. Fitting must have 1" flange with corner clips, pre-punched mounting holes and adhesive coated gasket. Take-off must be Flexmaster LDS, BO3, GSI HETO, HTS2, Elgen HETO or Crown 3300-DS2.

5.11. **Turns and Transitions:** Fabricate turns with an inside radius equal to width of duct. At 90-degree turns, Contractor may substitute square elbows, with standard factory-made, multiple, double-blade constructed vanes. Vanes must be a double wall, true airfoil contour with smoothly rounded entry nose with extended trailing edge. Vanes must be formed from a single piece of 26 ga., hot dipped galvanized steel and must be 3" radiused vanes on 2.4" centers. Vanes must be provided with two (2) tie rods and continuous internal tubes for stiffening and rigidity. Maximum pressure drop must be .06" W.G. at 1500 FPM. Generated sound power level must not exceed 54 decibels in band 4 at 2000 FPM (24"x24" duct size). **Single wall turning vanes are not allowed.** Vanes must be manufactured by Aero/Dyne Series HEP, Duro Dyne HTV/DHV, DuctMate, Hamlin Sheetmetal or Spiral Systems Inc. Avoid abrupt changes in shape, with a slope of 4:1, the minimum allowed.

5.12. **Manual Volume Dampers:** For round ducts less than 12" diameter and rectangular ducts less than 12" in height in either dimension: Class 1A leakage, single leaf, blade constructed with 20-gauge galvanized steel frame and locking type control quadrant, single center U-bolt and pivot rod extending through opposite side of duct with brass bushing at both ends. Dampers must be manufactured by Ruskin MD-35, United Enertech MD-105, Greenheck MBD-10, Nailor 1820 or Pottorff CBD-01.

5.13. **Manual Volume Dampers:** For round ducts greater than or equal to 12" diameter or rectangular ducts greater than or equal to 12" height in either direction, provide opposed blade, airfoil blades of 16-gauge galvanized steel mounted in steel frames by 3/8" steel trunnions riding in brass bushing with dual U-bolts. Blade width must not exceed 10 inches, and individual blade length must not exceed 48 inches. Extend one trunnion to permit operation from outside the duct. Provide manually operated dampers with cadmium plated steel locking quadrant. Dampers opening to the outside must have felt edges. Dampers must be manufactured by Ruskin MD-35, United Enertech MD-105, Greenheck MBD-15, Nailor 1120 or Pottorff CBD-01.

5.14. **Stand-Off Mounting Brackets:** Locking-type quadrant operators for dampers, when installed on ducts to be externally insulated, must be provided with standoff mounting brackets, bases and adapters as required to provide clearance between the duct surface and the operator not less than 2" greater than the thickness of the insulation. Standoff mounting items must be integral with the operator or standard accessory of the damper Manufacturer as specified above.

5.15. **Duct Instrument Test Holes:** Provide for each system four test holes (two in supply duct and two in return air plenum) at opposite ends near air handling units with screwed caps. For duct mounted coils and electric duct heaters provide one on each side of the coil or duct heater.

5.16. **Flexible Canvas Connections and Bonding Jumpers:** Install so that the cloth is in folds (not drawn tight). Connect all ducts to air handling equipment and fans with preassembled flexible connection. Fabric width must be 6" for all air handling equipment. Ceiling mounted exhaust fans may be 4" width.

Connectors for all air handling equipment must be a factory fabricated and assembled unit with 6" dual fabric, heavy duty, 20 oz/sq. yd polyester/polyester fabric with flame resistant coating and mildew resistant per ASTM G-21. The assembly must comply with NFPA 701, NFPA 90A, NFPA 90B and ASTM E-84. The unit must be constructed of a minimum of 24 ga. galvanized steel meeting ASTM A-653-94-G60. Metal to fabric connectors must be double locked, airtight and waterproof to 10" W.C. positive pressure and 10" W.C. negative pressure. The assembly must be DuctMate PROflex with power lock connection or approved equivalent by DuroDyne.

Flexible connections for ceiling exhaust fans must be preassembled flexible connection of 29 ounce fire-resistant, neoprene coated glass fiber cloth equal to Ventfabrics "Ventglas" (4" fabric width) and manufactured by Ventfabrics, Wiremold, DuctMate, DuroDyne or Thermaflex.

Externally insulate all flexible connectors to prevent condensation with 2" thickness external duct insulation as specified later in this section. **Do not insulate flexible connectors until the installation of the below specified bonding jumper has been verified.**

Prior to insulating the canvas connector, provide copper jumpers across all flexible connectors taking care that jumpers do not bind flexible connections. Provide compression lug and grounding connector screwed into the duct with one (1) screw, on both side of the flexible connector. Bonding wire must be minimum shielded 12 AWG.

5.17. **Miscellaneous Bonding/Grounding of Metallic Items:** Wherever any bare metallic piping, conduit, structural elements or any other metallic assembly is in contact with externally insulated duct or bare sheet metal duct, bonding/grounding must be provided. The Contractor must provide 1/2" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to snuggly and completely cover the respective metallic item. The insulation must extend the full length of the affected area. Where channel shapes are used, orient the open side of the Unistrut assembly down. Materials that are not supported by Unistrut, sheet Armaflex, must be used provided it is properly attached to the duct or affected items. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification.

5.18. **Register and Grille Connections:** Where take-offs are in the side of a duct, clinch lock short tee sections onto trunk. Install collars with slip joints and 3/4" flange at outlet end. At sheetrock and other hard surfaces, set the collars exactly flush with surface.

Install boots above lay-in ceilings simultaneously with ceiling work.

At return air, relief air and exhaust air grilles 36" or more in either dimension, collars must be 1" x 2" x 1/8 inch steel angle frames with corners mitered, welded and ground smooth. Frames in the ceiling must be independently suspended from the ceiling structure, or the duct must have special reinforcing to prevent sagging of the boot.

The interior of all ductwork visible through grilles and diffusers must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

5.19. **Hangers and Supports:** **Duct hangers must NOT penetrate the external insulation vapor barrier. All duct hanger materials must be external of the insulation materials, insulation jacket and vapor barriers. All vapor barriers must be continuous and without penetrations.** All supports, assemblies, related components, attachments and required appurtenances must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective assembly. Where the Contractor has doubts about proper supporting requirements, he must consult with and seek the guidance of the Architect and the Structural Engineer.

Where duct supports are specified to be a Unistrut assembly, the Unistrut must be painted, powder coated, epoxy or plastic, same as specified above and in Section 15010, Part 4, Para. Coatings and Finishes. Duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy or plastic coated. Hanger rods and associated bolts and clamps on Unistrut assemblies are not required to be painted.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

"Sammy" bolts are prohibited. Contractor must provide supplemental steel between structural purloins, bar joists, etc., for duct support as required to meet support spacing specified. Supplemental steel must be welded in place as directed and specified by the Structural Engineer. Support small (less than 40 united (w+h) inches) horizontal ducts without external insulation with 1-1/4" x 20 ga. band hangers. Provide in pairs close to each transverse joint and in no case more than six feet apart. Bands must be turned 3" under the lower corner of ductwork and fastened with one (1) self-tapping screw into the bottom of the duct surface. Bands must be attached up the sides of the ductwork at a maximum of 6" intervals and in the bottom of the duct. Seal all screws with duct sealer as specified for ductwork.

Support vertical runs larger than 40 united (w + h) inches with structural brackets with welded joints.

Support all non-externally insulated horizontal ducts larger than or equal to 40 united (w+h) inches on trapeze type hanger assembly same as specified below for externally insulated duct except without AP Armaflex surround on the Unistrut. Install

inserts or clamps as required to accommodate overhead construction. Spacing must not exceed 6 feet.

All 14" or less concealed round ducts with external insulation must be provided with band hangers and saddles. Suspend ducts, at six (6) foot intervals with 8" long, 3" wide, 22 gauge galvanized metal saddles hung from structure with 22 gauge, 1" wide straps. Bands must pass completely under and around round ducts. Loop strap under duct and attach to strap with two (2) galvanized bolts. Thereafter, loop top end of hanger over steel structural members above and fasten with two (2) galvanized bolts. Where concrete joists occur overhead, secure straps to side of joist with galvanized expansion or ramset bolts. Where flat concrete surface occurs overhead, secure with ramset or expansion bolt fasteners. See other Specification Sections in the Contract Documents for limitations on use of power driven fasteners.

Where ducts are specified to have external insulation with a vapor sealed facing, support duct on trapeze hangers consisting of a Unistrut assembly with threaded rods.

On externally insulated ducts, install 3/4" thickness, **unslit** AP Armaflex insulation of sufficient inside tubular diameter to slide over the Unistrut support, completely cover and snuggly fit to the bottom horizontal Unistrut duct support. The AP Armaflex insulation must extend the full width of the insulated/uninsulated duct plus a minimum of 6", each side. Space hanger rods a minimum of 6" (maximum of 12") from the sides of the ductwork to permit the duct to be placed within the trapeze hanger assembly without being in contact with the externally insulated ductwork or bare metal ductwork. Where channel type Unistrut shapes are used, orient the open side, down. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification.

All concealed internally insulated round ducts must be supported as specified above for externally insulated ductwork except without insulation saddle. Coordinate exposed duct support requirements with plan details.

Where the ducts rise at the outside walls, the Contractor must provide a welded chair assembly, required support, attachments and, related and required appurtenances. The duct riser at the outside wall must maintain a distance between the wall and the finished insulated assembly as required to insulate the back side of the ductwork.

5.20. **Roof Exhaust Caps:** For exhaust ducts up to and including 12x12, must be low profile, sloped, galvanized steel construction with built-in bird screen, integral flashing flange and all accessories required for a complete installation. The cap must be Greenheck Series RJ, Cook Gemini RJ, Fantech RC or equivalent as required for sloped shingle roofs. Provide similar device for standing seam metal roofs or flat roofs as required by the roofing Manufacturer. All items furnished must adhere to roofing Manufacturer's requirements so as not to void the roofing warranty. Hoods must be factory primed for painting in the field or factory baked enamel finish as selected by the Architect.

5.21. **Flexible Air Ducts:** Flexible air duct must be factory made and composed of an inner duct of woven and coated fiberglass providing an air seal and permanently bonded to coated steel wire helix, a fiberglass insulating blanket and low permeability outer vapor barrier of fiberglass reinforced metallized film laminate. R-value must be a minimum R=8 per ASTM C-518.

Duct must be rated for a maximum pressure of 16” (4-10 in. ID) or 10” (12-16 in. ID) water column positive and 2” water column maximum negative pressure and 5000 FPM maximum velocity and Listed by Underwriters Laboratories, Inc., under UL Standard 181 as a Class 1 air duct and complying with NFPA Standards 90A and 90B. Duct must have a maximum flame spread of 25 and a maximum smoke developed rating of 50.

Flexible duct length must not exceed six (6) feet. Supply each duct with 1/2" wide, 200 Series **stainless steel worm gear driver and stainless steel band** at take-off fitting and supply fixture connections equal to Thermaflex Snaplock clamp. Zip tying is not allowed.

Suspend ducts, at three (3) foot intervals with 8” long, 3” wide, 22 gauge galvanized metal saddles hung from structure with 22 gauge 1” wide straps. Loop strap under duct and attach to strap with two (2) galvanized bolts. Thereafter, loop top end of hanger over steel structural members above and fasten with two (2) galvanized bolts. Branch duct connectors for connecting round low velocity branches to rectangular low velocity trunks must be factory fabricated rectangular to round or round to rectangular (as applicable) take-off fittings as detailed on the drawings with damper and standoff mounting bracket.

Provide a full size radiused, 90 degree galvanized sheet metal elbow transition piece from flexible duct connection to each diffuser boot/neck. Where conditions in the field do not allow for 90 degree elbow, a 45 degree full size radiused elbow must be used. Note that this provision to use a 45 degree full radiused elbow must not be used when a 90 degree elbow can be otherwise provided. Elbow gauge must be as specified hereinbefore in Part, “Sheet Metal Ductwork” for respective duct size.

Seal all joint connections as specified.

The flexible duct must be GreenGuard Level 4 certified, Thermaflex M-KE, ATCO UPC #031 or Flexmaster Type 1M.

PART 6. DUCT INSULATION WORK (EXTERNAL)

6.1. **General:** The Contractor must provide a complete insulation submittal detailing materials and methods as specified.

Where a conflict exists between these specifications and the Manufacturer’s requirements, the strictest installation must be provided.

The finished insulation system must provide complete thermal barrier throughout the equipment and air distribution system, including effective and durable vapor barriers and vapor stops for any system or condition potentially subject to condensation. An insulation system must be provided to prevent condensation or potential thereof, to prevent the transmission of water vapor into the insulation system (vapor barriers) and to prevent transmission of water vapor within the insulation system should vapor barrier compromises occur during operation and/or maintenance of the building (vapor stops).

The duct must be clean, dry, sealed and pressure tested before covering is applied. Cover flexible connections with insulation material as hereinafter specified to same thickness as adjacent duct. Install insulation with longitudinal seams at top and bottom of horizontal runs. Install multiple layers of insulation with longitudinal and end seams staggered. All insulation materials, coatings and mastics must be fire resistive per NFPA Pamphlet No. 90, ASTM C 411, must be UL listed and must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84, NFPA No. 255 or UL 723.

Refer to Section Sheet Metal Ductwork, Paragraph “Hangers and Supports” in this Section 15700 for additional requirements and for miscellaneous insulating requirements for externally insulated ductwork.

6.2. **Material:** Provide GreenGuard certified glass fiber duct insulation with reinforced foil kraft laminate jacket, formaldehyde-free.

All **supply air** and **return air** ductwork located above the ceiling within the building insulation envelope and below the ASHRAE required air barrier, in chases and other similar areas must be provided with **2” thickness, 1.5lb. density, duct wrap with reinforced foil kraft laminate jacket** as specified below.

All **exhaust air** ductwork must be provided with **1.5” thickness, .75lb. density, with reinforced foil kraft laminate jacket** as specified below. Note that this requirement does not apply to ductwork that is exposed to view in finished areas. Refer to internal duct insulation requirements for duct exposed to view in finished areas.

Thermal conductivity for **1.5” thickness** per ASTM C-518, **0.75 lb. density** must be not less than k=0.27 BTU·in/(hr·ft²·°F) and minimum installed R=4.2 at 75°F mean temperature with test based on material thickness compressed 25%.

Thermal conductivity for **2” thickness** per ASTM C-518, at its rated thickness and **1.5 lb. density** must be not less than k=0.24 BTU·in/(hr·ft²·°F) and minimum installed R=6.3 at 75°F mean temperature with test based on material thickness compressed 25%.

See “Duct Insulation (Internal)” for internal acoustical insulation required in addition to the external insulation specified hereinbefore.

6.3. **Thickness:** Exhaust ducts, louver and brick vent plenums and back panels of ceiling diffusers: 1.5” thickness, 3/4 lb. density with reinforced foil kraft laminate jacket. All other locations: Minimum 2.0” thickness and density specified above with reinforced foil kraft laminate jacket.

See limits of acoustic insulation in Part Duct Insulation Work (Internal) below. Where duct board is specified within the mechanical rooms, external duct wrap insulation is not required.

6.4. **Manufacturer:** Johns-Manville Micro-Lite EQ, Type 150 or Type 75 with thickness and density as specified above. Equivalent material from Knauf, Schuller, Owens Corning or CertainTeed will be accepted.

6.5. **Ducts to be Insulated Externally:** Supply air and return air ducts including ducts with acoustical liner, exhaust ducts, short branch duct collar connections to grilles, registers and diffusers, all flexible canvas connectors and exterior rim/cone/panel of all ceiling diffusers.

See Part "Duct Insulation Work (Internal)" for sound attenuating insulation requirements of externally insulated ductwork.

Do not externally insulate flexible canvas connectors until installation of the specified bonding jumper has been verified by the Engineer or the Authority having jurisdiction. If insulated at the time of the site visit, the insulation will have to be removed to verify the proper installation.

6.6. **Application:** Sheet metal duct must be clean, dry and tightly sealed at all joints and seams before applying duct wrap. Installation must be in strict accordance with the Manufacturers recommendations and these specifications. Adhere insulation to sheet metal with a brush or roller in manufacturer recommended workable sections with a water based, LEED compliant, low VOC liquid, not spray, insulation bonding adhesive. Wrap insulation tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". The 2" flange of the facing must be secured using 9/16" flare-door staples applied 6" on center and taped as specified hereinafter. On longitudinal joints, the overlap must be secured using 9/16" flare-door staples applied 6" on center and taped as specified hereinafter. For rectangular ducts wider than 23", additionally support insulation with weld pins and speed clips 18" on center with a minimum of two pins and washers for each section.

The liquid adhesive must be UL-723, ASTM E-84, NFPA 90A and 90B, LEED and ASTM C916 compliant, low VOC, moisture and mildew-resistant with suitability for high-humidity environments. The liquid adhesive must be Design Polymerics DP 2502, Foster 85-60, Vimasco 727 or Childers Chil-Quik CP-127.

Stop and point insulation around access doors and damper operators to allow operation without disturbing duct wrapping. Insulate standing seams and stiffeners that protrude through the insulation with 2" thick, faced, flexible blanket insulation.

Vapor seal all seams, joints, pin penetrations, other breaks, circumferential and longitudinal joints with reinforcing mesh and coat with vapor barrier facing. Mesh must be **4" wide pre-sized glass cloth** adhered and finished with two (2) coats of UL 181A-M compliant for sheet metal and duct board applications and UL 181B-M compliant for flexible ducts and flexible connectors. The sealant must be McGill United Duct sealer, Hardcast Seal-Tack, Vimasco No 749 Vapor-Blok or CHIL-PERM WB CP-35, vapor barrier coating as required to completely cover the mesh. Fiberglass cloth must be Great Lakes Textiles Style GL1658, 20x10 thread count per square inch, 0.004-inch thickness and 1.60 oz. /sq. yd., Childers Chil Glas #10 glass mesh, Foster Mast-A-Fab polyester mesh or equivalent product by 3M. **No FSK or any metallic tape will be allowed. Where FSK tape is discovered or used, the entire surface of the FSK tape must be covered with fiberglass cloth and mastic and must overlap both edges of the FSK tape by a minimum of 2"**.

Any externally insulated duct with metallic vapor barrier that is in contact with metallic piping, conduits or metallic structural members must be provided with a section of Rubatex insulation between ductwork and the metallic member. Rubatex must be 3/4" thickness, AP Armaflex insulation of sufficient inside tubular diameter to slide over, completely cover and snuggly fit the contacted item. The insulation must extend

the full width of the duct plus a minimum of 6", each side of the duct. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification. The use of AP Armaflex insulation between piping and ductwork will only be allowed when raising the effected duct is not an option.

6.7. **Insulation Pins and Washers: The use of adhesives for attaching pins and washers to the ductwork is prohibited.** Pins must be cupped-head, capacitor-discharge-weld pins, zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135 inch diameter shank, length to suit depth of insulation specified with integral 1-1/2 inch galvanized carbon-steel washer. Insulation retaining washers must be self-locking type formed from 0.016-inch thick galvanized steel with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

6.8. **Ducts From Outdoor Packaged Equipment to Point Inside Building:** Must be insulated externally (in addition to duct liner) with 2" thickness, 4.25 lb. density, R=9.1 duct board equal to Owens-Corning Series 815 Spin-Glas. Protect external insulation with open weave glass or polyester cloth by Johns-Manville Duramesh, Childers Chil Glas #10 or Foster Mast-A-Fab, embedded between two 1/8" coats of Foster 60-91 (gray) Monolar Mastic or Childers Encacel X-1 (gray). After insulating, cover all ductwork with 24 ga. cross-broken or beaded prefinished Kynar 500 sheet metal and slope to drain away from the building and to sides of ductwork with so as not to discharge rainwater to the supply and return air connections of the unit. Provide a trough as required. Sheet metal cover must be cross broken or beaded. The Architect must select color.

PART 7. DUCT INSULATION WORK (INTERNAL)

7.1. **General:** All work by experienced applicators in accordance with Manufacturer's recommendations and these specifications. Where a conflict exists between these specifications and the Manufacturer's recommendations, the strictest installation must be provided.

Duct liner, mastics and materials must comply with all requirements and other building code requirements. All insulation materials (coatings and mastics) must be fire resistive per NFPA Pamphlet No. 90A and 90B and must be UL listed and must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Liner materials must conform to the performance based ASTM C1071, which includes ASTM C518 Thermal Conductivity, ASTM C411 Temperature Resistance, ASTM C665 Corrosiveness, ASTM E84 Surface Burning Characteristics, ASTM C1338 Fungi Resistance, ASTM C1304 Odor Emissions and ASTM C1104 Moisture Vapor Sorption.

7.2. **Material:** Liner must be a GreenGuard certified, low VOC, Type I liner as defined by ASTM C1071 and characteristics complying with ASTM E 84, UL 723, NFPA 255, NFPA 259 and ASHRAE 62. It must have an acrylic coating formulated with an immobilized, EPA registered, protective agent to protect against growth of fungi and bacteria as required by ASTM C1071 and tests conducted in accordance with ASTM C 1338, ASTM G21 and ASTM G 22. It must not support microbial growth and have glass fibers bonded with a thermosetting resin. The airstream surface must be protected with a reinforced coating with flexible glass cloth reinforcement. The liner

must have a reinforced factory applied edge coating and operate in an environment of a maximum of 250°F and maximum of 6,000 fpm air velocity. Thermal conductivity per ASTM C-518, at its rated thickness, must be not less than k=0.16 BTU·in/(hr·ft²·°F) and R=6.3 at 75 F mean temperature in accordance with ASTM C18. Sound absorption coefficients for the liner must be per ASTM C 423 and ASTM E 795 test methods and the table below. **Furnish sound characteristics for review with the material submittal.**

Sound Absorption Coefficient at Frequency

Thickness (In)	(Cycles per Second) 125	250	500	1000	2000	4000	NRC
2.0	0.25	0.66	1.00	1.05	1.02	1.01	0.95

7.3. **Manufacturer:** Must be Johns Manville Linacoustic RC or equivalent material by Schuller, Knauf, Pittsburgh, CSG, Owens Corning or CertainTeed.

7.4. **Thickness:** 2.0" thickness.

7.5. **Acoustical Duct Lining:** Line the first ten (10) linear feet of all single wall, supply air and return air ducts downstream of the packaged heat pump unit with insulation equal to Johns Manville Linacoustic RC and **2.0" thickness.** Sound absorption characteristics must be as specified above.

7.6. **Application:** Sheet metal duct must be clean, dry and tightly sealed at all joints and seams before applying duct installation. Installation must be in strict accordance with the Manufacturers recommendations and these specifications. Adhere insulation to sheet metal with a brush or roller in manufacturer recommended workable sections with a water based, LEED compliant, low VOC liquid, not spray, insulation bonding adhesive. Adhere insulation to the manufacturer's recommended workable section of the sheet metal surface prior to breaking the sheet metal. Cutting of the insulation and then adhering the insulation to the sheet metal is prohibited.

Insulation joints must be straight and smooth and must be buttered with the specified adhesive to prevent erosion and improve airflow. The product must have a factory applied edge coating to assure sealing of transverse edges per SMACNA HVAC Duct Construction Standards - Metal and Flexible, 4th Edition (2020) and NAIMA installation standards.

After adhering the duct insulation to the sheet metal, secure all insulation on ducts with weld pins and clip type fasteners. Pins must be welded to the sheet metal. Do not use adhesive. Fasteners must be located within 3 inches of the upstream and downstream edges of each liner section. Fasteners are required within 4 inches of all longitudinal edges and 6 inches of corners, with a maximum 12-inch spacing longitudinally and 18-inch spacing transversely. In general, provide spacing as required by SMACNA HVAC Duct Construction Standards - Metal and Flexible (4th Edition, 2020.

The liquid adhesive must be a premium, water-based, brush/roller applicable adhesive designed for bonding fibrous insulation (e.g., fiberglass duct liner) to the interior of HVAC ductwork. It must be UL-723, ASTM E-84, NFPA 90A and 90B, LEED and ASTM C916 compliant, low VOC, moisture and mildew-resistant with suitability for high-humidity environments. Spray type adhesives are not allowed.

Sealing exposed potions of the insulation joints and damage to the liner must be repaired using the specified adhesive products following recommendations provided by the Manufacturer of the adhesive.

Adhesive must be Design Polymerics DP 2502 Duct Liner and Insulation Adhesive, Childers Chil-Quik CP-127 or Foster Quick-Tack 85-60 Duct Liner Adhesive.

7.7. **Insulation Pins and Washers: The use of adhesives for attaching pins and washers to the ductwork is prohibited.** Pins must be cupped-head, capacitor-discharge-weld pins, zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135 inch diameter shank, length to suit depth of insulation specified with integral 1-1/2 inch galvanized carbon-steel washer. Insulation retaining washers must be self-locking type formed from 0.016-inch thick galvanized steel with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

7.8. **Metal Nosings: All exposed leading and trailing edges must be secured with sheet metal nosings to protect insulation edges**. Metal nosings must be securely installed over all transversely oriented liner edges facing the airstream at forward and rear discharge towards coils, dampers, ducts, plenums, changes of insulation thicknesses of adjoining insulation, any exposed insulation ends and at any point where lined duct is preceded by unlined duct. See detail on the plans. All remaining miscellaneous exposed edges must be sealed/coated. There must be no exposed fiberglass insulation.

PART 8. REGISTERS, GRILLES AND DIFFUSERS

8.1. **General:** All grilles, registers and diffusers must be product of a single Manufacturer with baked enamel finish and standard **or** custom color as selected by the Architect. Architect may require painting of the diffusers, grilles, registers, etc., in the field. Where field painting is required, diffusers, grilles and registers must be factory primed for painting in the field. Refer to Architectural Section “Painting”, coordinate requirements and provide finish as required.

Where lay-in ceilings occur, all specified items must have integral 2’ x 2’ or 2’ x 4’ aluminum modular lay-in ceiling panel with finish to match diffuser. Refer to Architectural reflected ceiling plan, check ceiling suspension system, wall and ceiling finishes and provide for proper interface as required.

All ceiling grilles, registers and diffusers not in integral lay-in metal panels and installed in gypsum board or other hard surfaces must be mounted with aluminum-countersunk screws with finish to match respective items.

Where ceiling mounted devices are installed in hard ceilings, provide appropriate trim ring as required such that screws are not visible in the face of the device. Flat countersunk screws are only allowed when concealing them is not an option.

All ceiling diffusers back panels must be insulated with 1” thickness, foil backed insulation and securely attached. Contractor must furnish the item with factory furnished insulation from the item Manufacturer. Factory provided insulation must be attached as shown on the plan details.

All grilles, registers and diffusers must be ADC or approved equivalent Agency certified.

8.2. **Square Ceiling Diffusers with Round Neck:** Titus Model TMSA-AA, Price ASCDA, removable core type, aluminum construction, with baked enamel standard or custom finish color selected by the Architect, designed for four-way diffusion complete with Titus AG-85, Price VCR8E steel butterfly blade damper. Diffuser face must be 24" x 24" with type frame to interface with ceiling system. Use lay-in type frame where lay-in ceilings occur.

8.3. **Wall Supply Air Registers:** Titus Model 300 RL-HD heavy duty steel supply grilles with front blades parallel to the long dimension of the grille. Construction must be of steel with a 1-1/4" wide border on all sides and a minimum border 18 gauge and auxiliary mounting frame/trim ring for all sizes up to 48x48. Mounting frame/trim rings are not required where the registers are attached to exposed ductwork. Screw holes must be countersunk for a neat appearance. Corners must be welded with full penetration resistance welds. Front deflection blades must be 14-gauge steel, adjustable from 0°- 40° and spaced on 1/2" centers. Rear deflection blades must be 26-gauge steel spaced on 3/4" centers. Provide each wall grille with opposed-blade volume damper which must be constructed of heavy gauge steel. Damper must be operable from the face of the grille with a screwdriver.

The finish must be an anodic acrylic paint, baked at 315° F for 30 minutes. The pencil hardness must be HB to H. The paint must pass a 100-hour ASTM B117 Corrosive Environments Salt Spray Test without creepage, blistering or deterioration of film. The paint must pass a 250-hour ASTM D870 Water Immersion Test. The paint must also pass the ASTM D2794 Reverse Impact Cracking Test with a 50-inch pound force applied.

The grille must have baked enamel standard or custom finish color selected by the Architect.

8.4. **Wall Return Air Registers:** Titus Model 33R-PF, Price Model 91-L-D-A-VCS3 gymnasium heavy duty steel register with 38 degree deflection 14 ga. blades, support bars on 6" centers, Allen key operated aluminum opposed blade damper and auxiliary mounting frame for all 48" or less in size, with baked enamel standard or custom finish color selected by the Architect.

8.5. **Manufacturers:** Equivalents by Titus, Price and Krueger will be accepted. Titus and Price are basis of design.

PART 9. CONDENSATE DRAINAGE PIPING

9.1. **General:** Cut accurately to measurements established at site and work into place without springing or forcing, properly clearing all building features. Arrange and install piping systems sizes as shown, as close as practical, straight, properly supported and run as directly as possible forming right angles or running parallel with building lines, true to line and grade, free of sags and bends. Locate piping as high as practical and in parallel groups as close together as practical. Route through previously built-in sleeves and avoid cutting or other weakening of the structure. Make changes in direction and size with fittings. Bushings are prohibited. Cap or plug open pipe ends during installation to keep out foreign material.

Before installation, piping must be checked, upended, swabbed and all dirt from storage or from lying on the ground must be removed. **All piping must be clean when it is installed.**

Make all connections to equipment using screwed unions. Install unions in all piping connections to each piece of equipment, including traps, pumps, coils, etc. **Per IMC 307.2.5, condensate drain lines must be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.** Refer to plan details for detailed requirements of the assembly.

9.2. **Condensate Drain Piping and Drain Piping:** Interior condensate drainage piping material must be Type L hard copper tubing with wrot copper solder joint fittings with 45° or 90° offset fittings. ProPress or similar type fittings/joints are not allowed.

Outdoor condensate drainage piping must be Schedule 80 solid wall PVC pipe conforming to ASTM Standard D1785. Schedule 80 fittings must be injection mold and must conform to ASTM D 2464. Pipe and fittings must be manufactured from virgin rigid PVC (polyvinyl chloride) vinyl compounds with a cell class of 12454 as identified in ASTM D 1784. PVC Schedule 80 pipe must be Iron Pipe Size (IPS) conforming to ASTM D 1785. Injection molded PVC Schedule 80 fittings must conform to ASTM D 2467. PVC Schedule 80 threaded fittings, where specified, must conform to ASTM D 2464. Pipe and fittings must be manufactured as a system and be the product of one manufacturer. All pipe and fittings must conform to NSF International Standard 61 and the health effects portion of NSF Standard 14. Installation must comply with the latest installation instructions published by the piping manufacturer and must conform to all applicable plumbing, fire and building code requirements. Solvent cement joints must be made in a two-step process with a primer meeting ASTM F 656 and a medium- or heavy-bodied solvent cement conforming to ASTM D 2564. The system must be protected from chemical agents, fire-stopping materials, thread sealant, plasticized vinyl products or other aggressive chemical agents not compatible with PVC compounds. The system must be hydrostatically tested after installation as specified hereinbefore. All Schedule 80 piping and fittings must have factory applied UV protective coating and tested for sunlight resistance according to UL 651 requirements.

All cooling coils and evaporator coils horizontal condensate drainage piping must be sloped a minimum of 1/8” per foot. The condensate drain line size must be full size of unit condensate outlet and in no case, less than 3/4 inch.

The condensate drainage assembly must be made up of materials specified above. The assembly must consist of p-trap, unions, air bleeder/open vent with 1/8” screen over open portion, etc., as required by the equipment Manufacturer. **Running p-traps are not allowed.**

Ductless mini-split equipment that produces condensate must be provided with an inline check valve located in the drain line or a trap as required by IMC 307.2.4.1.

In absence of the Manufacturer’s requirements, condensate drainage assembly must be as shown on the plans. **Per IMC 307.2.5, condensate drain lines must be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.** Refer to the details on the plans and the requirements below for unions required in the condensate piping.

Install a UL 508 conforming electric switch in the secondary drain line of each condensate producing piece of equipment. The switch must automatically shut off the equipment served in the event the primary drain line becomes restricted.

9.3. **Copper Joints:** Make assemblies with tin-antimony (95-5) solder and non-corrosive flux (this does not apply to refrigerant piping). Clean and polish the tube and the inside of the fittings, using No. 60 steel wool. Apply flux and place fitting on the tube. Heat joint evenly but take care not to overheat fitting. Apply solder until a solder line shows completely around the joint. Remove surplus solder and allow joint to cool. **ProPress or similar type fittings/joints are not allowed.**

9.4. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.

9.5. **Unions:** Unions must be of the following types:

Copper Lines: Ground joint, copper to copper.

Schedule 80 PVC: Solid wall PVC schedule 80 DWV pipe and fittings as specified hereinbefore.

Dielectric Unions: Provide where copper pipe joins to steel pipe, EPCO or approved equivalent. Contractor must provide a ball valve on each side of each dielectric union to allow for replacement of the union.

9.6. **Expansion:** Provide for expansion and contraction of all piping and make proper provisions so that there must be no undue strain on any pipe or equipment.

9.7. **Sleeves:** Refer to Section 15010, Pipe Sleeves.

PART 10. REFRIGERANT PIPING AND ACCESSORIES

10.1. **General:** All refrigerant piping must be identified. **Note that refrigerant piping will require custom identification.** Refer to Section 15010, Part Identification for requirements.

The International Mechanical Code requires that the installing Contractor issue on his company letterhead, to the Local Code Official and the Authority Having Jurisdiction, a certificate of testing for all systems containing 55 pounds or more of refrigerant. The certificate must give the unit number as shown on the plans, the test date, name of the refrigerant, test medium and the field test pressure applied to the high pressure side and the low-pressure side of the system. The certification of the test must be signed by the installation Contractor.

10.2. **Refrigerant Piping Sleeves:** Refer to Section 15010 and plan details and provide sleeves, firestopping and escutcheons as specified for typical piping. Sleeves for pipe passing through exterior walls that contain refrigerant piping must be Schedule 80, ASTM D1785 PVC pipe, 1/2" larger in diameter than piping and piping covering. Refer to Section 15010 and below for requirements.

Coordinate wall sleeve sizes required for refrigerant piping with insulation and aluminum jacket requirements. Piping within wall cavities must be seamless with no joints.

Note that all liquid, suction and hot gas reheat coils refrigerant piping must be insulated as specified from point of connection to condensing unit to a point inside the wall. Do not install more than two pipes through each wall sleeve.

10.3. **Protection of Physical Damage for Piping:** In concealed locations where piping is installed through holes or notches in studs, joists, rafters or similar type members, the pipe must be protected by shield plates and plastic grommets. Protective steel shield plates having a minimum thickness of 0.0575 inch (16 gage) must cover the area of the pipe where the member is notched, drilled or bored and must extend not less than 2 inches above sole plates and below top plates.

10.4. **Piping Diagram:** System must be complete and sized to conform to current ACRMA standards, except that refrigerant suction risers must be sized for a gas velocity not less than 2000 fpm.

Various Manufacturers of heat pump mini-split systems have different reasons for the use of loops, traps, accumulators, receivers, etc., in piping arrangements, therefore, submit for review, the air conditioning equipment Manufacturer's recommended, dimensioned plan view and isometric piping diagram proposed for use for each system, showing all valves, loops, pipe sizes and all appurtenances, required for the proper operation of the respective system.

Submit catalog data and Manufacturer's ratings for all valves, catch-alls, etc. with diagram for each system. Identify all items for respective system and list capacities, pressure drops, etc. Secure approval of the heating and air conditioning equipment and compressor Manufacturer before submitting for review.

Failure to provide the Manufacturers' approved diagram(s) must make the Mechanical Contractor responsible for all required changes to the piping system and equipment without additional cost to the Owner or his Design Professionals should the installation not be as required by the Manufacturers.

Refrigerant piping support spacing must be a maximum of eight (8) feet horizontally and six (6) feet vertically. Cut accurately to measurements established at site and work into place without springing or forcing, properly clearing all building features. Arrange and install piping systems, as close as practical, straight, properly supported and run as directly as possible forming right angles or running parallel with building lines, true to line and grade, **free of sags and bends**. Locate piping as high as practical and in parallel groups as close together as practical. Route through previously built-in sleeves and avoid cutting or other weakening of the structure.

Refrigerant piping for all outdoor units mounted slab on grade must enter the building at the respective building finish floor or crawl space level and at a maximum of 12" above finish floor of the facility. The Contractor must coordinate the final refrigerant piping entrance into the building with the Architect's Field Representative prior to installing any refrigerant piping.

All refrigerant piping, including mini-split and VRF piping, must be ACR - ASTM B 280, Type L hard drawn, ACR copper refrigerant tubing with ASME B16.22 wrot

copper fittings and unions with solder joints of 95-5 tin antimony. **Coiled copper and precharged line sets are NOT allowed.** All offsets and changes in direction must be made with 90º or 45° elbows.

Where refrigerant piping is shown rising in the wall cavity and requires modifications to the block wall due to the size of the piping and insulated assembly, the block must be neatly saw cut. Provide reinforcing to the affected portions of the wall as indicated on the structural drawings and details, the same as required at window and door openings. See the structural drawings for specifics. Extreme coordination is required prior to the erection of the structural slab and wall. Coordinate with the General Contractor.

10.5. **Refrigerant Piping Testing:** Two tests are required. The medium used for pressure testing the refrigerant system must be oxygen-free nitrogen, helium or argon. Oxygen, air, combustible gases and mixtures containing such gases must not be used as a test medium. Systems erected on the premises with tubing not exceeding 5/8 inch outside diameter must be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

The refrigerant piping system must be tested as a whole, or separate tests must be conducted for the low-pressure side and high-pressure side of the piping system. The refrigerant piping system must be tested in accordance with both of the following methods:

Test 1: The system must be pressurized for a period of not less than 60 minutes to not less than the lower of the design pressures or the setting of the pressure relief device(s). The design pressures for testing must be the pressure listed on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel or other system component with a nameplate. Additional test gas must not be added to the system after the start of the pressure test. The system must not show loss of pressure on the test pressure measuring device during the pressure test for a minimum of 24 hours.

Test 2: A vacuum of 500 microns must be achieved. After achieving a vacuum, the system must be isolated from the vacuum pump. The system pressure must not rise above 1,500 microns for a period of not less than 60 minutes.

Where using refrigerant as a test medium as specified above, the test pressure must be not less than the saturation dew point pressure at 77°F.

10.6. **Joints: Brazed joints only. Flare joints nor press connect type joining systems are allowed.** Brazed Joints (Nitrogenized ACR Hard Drawn Copper – ASTM B280,) with joints made according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

Joint surfaces must be cleaned. An approved flux must be applied where required by the braze filler metal Manufacturer. The piping being brazed must be purged of air to remove the oxygen and filled with oxygen-free nitrogen, helium or argon. The piping system must be prepurged with an inert gas for a minimum time corresponding to five volume changes through the piping system prior to brazing. The pre-purge rate must be at a minimum velocity of 100 feet per minute. The inert gas must be directly connected to the tube system being brazed to prevent the entrainment of ambient air.

After the pre-purge, the inert gas supply must be maintained through the piping during the brazing operation at a minimum pressure of 1.0 psi and a maximum

pressure of 3.0 psi. The joint must be brazed with a filler metal conforming to American Welding Society Publication AWS A5.8, Current Edition.

Piping within wall cavities and other inaccessible areas must be seamless with no joints.

10.7. **Solenoid Valves (Where Required):** Comply with AHRI 760 and UL 429; listed and labeled by a Nationally Recognized Testing Laboratory (NRTL). Install in liquid refrigerant connection to the evaporators. Valves must be designed for the operating pressure and capacity as listed in the Manufacturer's catalog with a pressure drop not exceeding 2 psi and must be sufficient for the requirements of the installation. Install in horizontal runs with body vertical.

10.8. **Expansion Valves (Where Required):** AHRI 750 compliant, steel shell with ductile-iron cover, stainless-steel screws and neoprene gaskets properly sized diaphragm or bellows type, with external superheat adjustment set for 10 degrees F. superheat. Install in the liquid refrigerant supply lines to the evaporators. Expansion valves up to and including 7-1/2 tons capacity must be Sporlan Type "S" or approved equivalent. Expansion valves over 7-1/2 ton capacity must be Sporlan Type "O" or approved equivalent. Install Sporlan full size catch-all filter-drier ahead of valve.

10.9. **Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass and locking tamper resistant caps. This requirement does not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

10.10. **Refrigerant Filter Drier (Catch-All):** AHRI Standard 710 compliant (Performance Rating of Liquid-Line Driers; ratings determined in accordance with ASHRAE Standard 63.1), Parker Sporlan Catch-All series with molded porous core multi-desiccant blend (or approved equivalent). Filter driers up to and including 10-ton nominal capacity must be sealed type. Filter driers over 10-ton nominal capacity must be replaceable core type. Units must have minimum surface filtering area, water capacity, acid removal capacity and refrigerant flow capacity not less than that shown in the current edition of Parker Sporlan Bulletin 40-10 (or successor bulletin) under sizes recommended for "field replacement or field built-up systems."

Filter driers must be UL Listed per UL 207 and CSA Certified per CSA C22.2 No. 140.3 ("Refrigerant-Containing Components and Accessories, Nonelectrical"), rated for the maximum working pressure of the system (minimum 650 psig unless a higher system design pressure governs) and approved by the manufacturer as fully compatible with the specific refrigerant(s), lubricant type and system chemistry. Compatibility must be confirmed in the manufacturer's current published data, refrigerant compatibility listings and Bulletin 40-10, including all low-GWP HFC/HFO blends and A2L refrigerants (such as R-32, R-454A, R-454B) where used in the project.

Careful attention must be given to providing the correct type of filter drier as it pertains to the type of equipment, refrigerant and operating conditions of the

respective system. Install in accordance with manufacturer instructions with flow direction arrow aligned with refrigerant flow.

10.11. **Refrigerant Piping Identification:** **Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled or handwritten identification is not allowed.** The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and in particular the custom labels and installation requirements prior to certain site visits**.**

10.12. **Miscellaneous Requirements:** Taping or zip tying of liquid lines to suction lines is not allowed. Coordinate wall sleeve sizes required for refrigerant piping with insulation and aluminum jacket requirements.

PART 11. PIPE HANGERS AND SUPPORTS

11.1. **General:** Refer to Section 15010 for sleeve/firestopping requirements. **This pipe hanger and support section does not apply to refrigerant piping or condensate drainage piping.** Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification for refrigerant piping and condensate drainage piping support requirements.

11.2. **Painting of Hangers and Supports:** Galvanized, zinc similar coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts, nor clamps on Unistrut assemblies are required to be painted. All non-galvanized and galvanized ferrous metal parts of hangers, piping and related items in mechanical rooms, crawl space, above ceilings, Unistrut and other assemblies used for supporting ducts (except hanger straps and threaded rods), including black steel pipe, uncoated cast iron pipe, hangers, brackets, etc. must be coated.

All finishes and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See specification Section 15010, Part Identification for detailed requirements.

PART 12. PIPE INSULATION AND MISCELLANEOUS INSULATION WORK

12.1. **General:** All work by experienced applicators in accordance with Manufacturer's recommendations and these specifications. Where the specified installation conflicts with the Manufacturers recommendations, the strictest application must be provided.

Piping must be clean; dry and pressure tested before covering is applied. Size pipe hangers to fit over insulated pipe size. **Hangers and supports must not be in contact with bare pipe and must not penetrate the vapor barrier**.

Cover fittings, valves and flanges with insulation material as hereinafter specified to same thickness as adjacent pipe covering except screwed unions in hot and chilled piping and other specifically mentioned items. Neatly bevel covering edges or use prefabricated fittings as specified, adjacent to unions and other points of termination.

All insulation materials including coatings and mastics must have a composite rating for insulation, jacket or facing, including adhesives, not to exceed 25 flame spread

and 50 for fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723.

All piping must be provided with sleeves/firestopping assemblies. Refer to Section 15010 for sleeve and firestopping requirements.

12.2. **Refrigerant Suction Lines, All Exterior Refrigerant Piping Including Liquid Lines and Mini-Split System Liquid Lines:** Preinsulated refrigerant piping is not allowed unless insulation meets the requirements specified below. Coiled nor precharged line sets are allowed unless noted or specified otherwise. Refer to other portions of this specification for refrigerant piping requirements. All liquid lines located outdoors must be insulated and installed within the specified aluminum jacket with the insulated refrigerant suction line. i.e., one aluminum jacket for both insulated pipes. Refer to aluminum jacket requirements below for additional information.

Insulate with 1" thickness, UL fire and smoke rated unslit, black, flexible foamed, elastomeric, closed cell pipe insulation by AP Armaflex, Aeroflex Aerofit, K-Flex Insul-Tube or Aerocell AC EPDM. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.256 at 90°F mean temperature, water absorption percent by volume of 0.2 and a water vapor transmission rate of 0.05 perm-inches or less.

Slip insulation onto pipe prior to erecting. Longitudinal cutting of the insulation is prohibited. Do not miter, stretch or bend insulation at any turn, tee, etc. Insulate with factory fabricated fittings for tees, elbows, unions, etc., the same size as on adjacent piping and manufactured by AP Armaflex, Aeroflex Aerofit, K-Flex Insul-Tube or Aerocell.

On piping with screwed fittings, make up fitting covers from Armaflex with an inside diameter large enough to overlap the insulation on the pipe next to the fitting. Fitting cover must be long enough to overlap the pipe insulation with a minimum of one inch on each side.

Seal all butt joints of insulation and all butt joints at the specified refrigerant piping clamp with AP Armaflex BLV, Black, low VOC, liquid, air-drying contact adhesive. Do not use aerosol adhesive. After gluing joints, wrap all joints with 2" wide, 1/8" thick AP Armaflex self-adhering tape.

All insulated piping must be continuous without cutting at clamp/support assemblies. All interior refrigerant liquid lines which are not associated with a hot gas reheat coil or liquid lines NOT required to be insulated by the equipment Manufacturer must not be insulated except, they must be provided with insulated cushion clamp insert and attached to the Unistrut assemble as specified below.

Note that Various Manufacturers of mini-split and VRF systems require the insulating of refrigerant liquid lines. When required by the Manufacturer, they must be insulated using materials specified above and in thickness required by the respective Manufacturer. Where the VRF or mini-split system Manufacturer requires less than 1" insulation, install thickness recommended with materials specified above using methods specified below.

12.3. **Condensate Drain Lines Insulation:** To include discharge lines on all equipment specified with or provided with air conditioning condensate drainage pumps. Insulate with 3/4" thickness, UL fire and smoke rated unslit, black, flexible foamed, elastomeric, closed cell pipe insulation and factory fabricated fittings as specified above by AP Armaflex, K-Flex Insul-Tube or Aerocel AC EPDM. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.256 at 90°F mean temperature, water absorption percent by volume of 0.2 and a water vapor transmission rate of 0.05 perm-inches or less. See below for clamp and pipe supports assembly.

12.4. **Refrigerant Pipe Supports and Clamp Assembly: Do not use clevis hangers for refrigerant piping.** Refrigerant piping supports must be provided with an insulated piping clamp assembly attached to a Unistrut assembly. The Unistrut assembly must support the horizontal and vertical refrigerant piping on intervals not exceeding 8 feet. Provide dielectric separation between dissimilar metals. Support piping so that no vibration will be transmitted to the building structure.

The insulated piping clamp assembly must be provided at each Unistrut hanger for each insulated liquid line, each insulated hot gas reheat coil line and each insulated suction line. The insulated clamp must provide a crush resistant airtight seal and must consist of a rigid, closed cell, foam insulation to support tubing and absorb vibration. The outer cover must consist of a rubber coating that seals the cushion completely after installation. Clamps must be steel with electrodichromate finish. The rated assembly temperature range must be -50ºF to +250ºF. It must be self-extinguishing as tested under ASTM D 635.

After installing the device, glue each butt joint and tape each joint with 2" wide, 1/8" thick AP Armaflex self-adhering tape.

Insulated lines must use Wesanco Series Cush-A-Therm ZSI UX with specified rigid insulation thickness for the required pipe size, gold electro-galvanized channel clamp assembly and required hardware or equivalent by ArmaFix Eco Light or Aerofix by Aeroflex. Wesanco ZSI Series Cush-A-Therm UX is the basis of design.

Uninsulated liquid lines must be attached to the support assembly with cushion clamps. Clamps must be Wesanco ZSI Series Cush-A-Clamp gold electro-galvanized channel clamp assembly with thermoplastic elastomer and required hardware or equivalent.

For units on concrete pad, support piping with rustproof coated, 1-1/2" x 1-1/2" x 1/8" galvanized steel angle supports anchored to pad with stainless steel base plate, bolts and clamp assembly. The above specified clamp assembly is not required on exterior refrigerant piping that is covered with an aluminum jacket. Anchor aluminum jacket to support assembly.

12.5. **Interior Condensate Drain Lines Pipe Supports and Clamp Assembly: Do not use clevis hangers for condensate drainage piping.** Condensate drain line support, including discharge lines on all equipment specified with or provided with air conditioning condensate drainage pumps, must be provided with an insulated piping clamp assembly on a Unistrut assembly. The Unistrut assembly must support the horizontal and vertical condensate drainage piping on intervals not exceeding 8 feet. Provide dielectric separation between dissimilar metals. Support piping so that no vibration will be transmitted to the building structure.

The insulated clamp must provide a crush resistant airtight seal and must consist of a rigid, closed cell, foam insulation to support the tubing. The outer cover must consist of a rubber coating that seals the cushion completely after installation to prevent condensation. Clamps must be steel with electrodichromate finish. The assembly must be self-extinguishing as tested under ASTM D 635.

After installing device, glue each butt joint with liquid adhesive and tape each joint with 2” wide, 1/8” thick AP Armaflex self-adhering tape. Spray adhesive is not allowed.

Support piping with rustproof coated, 1-1/2” x 1-1/2” x 1/8” galvanized steel angle supports anchored to the floor/wall with steel base plate and bolts. Condensate drainage piping must be attached to the support with the insulation assembly specified above. Insulate using same methods and materials as specified for refrigerant piping (small, chilled water piping) except 3/4” thickness.

Combustion chamber condensate drain lines from high efficiency gas fired furnaces are not required to be insulated.

Insulated condensate drain lines must use Wesanco Series Cush-A-Therm ZSI UX with specified rigid insulation thickness for the required pipe size, gold electro-galvanized channel clamp assembly and required hardware or equivalent by ArmaFix Eco Light, Aerofix by Aeroflex. Wesanco Series Cush-A-Therm ZSI UX is the basis of design.

12.6. **Refrigerant Piping and Condensate Drainage Piping Aluminum Jacket:** All insulated exterior refrigerant piping and all insulated condensate drainage piping terminating in janitor sink must be covered with an aluminum jacket.

Where refrigerant piping rises within the wall cavity to above the ceiling, attic or similar space, the aluminum jacket must terminate within the exterior wall cavity and sealed weather tight to the sleeve in the wall.

The aluminum jacket must be 18 ga., .04” thick, **smooth finish**, 3003 and 3105 series aluminum conforming to ASTM B-209 standards. Fittings must be 18 ga., .04” thick, die shaped and **smooth finish**, Type 1100 aluminum jacket meeting ASTM C585. Provide 1/2" wide, 18 ga., .04” thick, Type 3003 aluminum bands on maximum 24" centers but not less than two bands per jacket section. **Venture Clad or similar product is prohibited.**

Do not install aluminum jacket until refrigerant piping insulation installation has been inspected by the Engineer.

12.7. **Painting and Identifying:** Paint and identify after installation is completed as specified in Section 15010, Part Identification. Where piping is specified with an aluminum jacket, painting is not required.

Provide identification on the insulation covering indicating unions, strainers and check valves. Refer to Section 15010, Part Identification and note special refrigerant piping identification requirements. **Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled or handwritten identification is not allowed.**

The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits**.**

12.8. **Submittal Data:** Submit for review complete data on materials and application methods proposed.

PART 13. VENTILATION

13.1. **General:** All fans must be furnished completely with ducts, grilles and required accessories. All fans provided with steel wheels. No plastic or non-metallic wheels are allowed unless specified otherwise.

All fans must be certified in accordance with AMCA/ANSI Standards 210 and ANSI/ASHRAE 51. Fans wheels must be balanced in accordance with AMCA Standard 204-05. Fans must be listed at UL 705 and must bear the UL Label. Furnish for review capacity and sound power ratings.

All motors 1/2 HP and smaller must have built-in overload protection.

All motors with scheduled capacity of less than 1 HP must be ECM type as required by ASHRAE 90.1 and with minimum motor efficiency of 70% when rated in accordance with DOE 10 CFR 431.

13.2. **Power:** Contractor must verify all voltage and power requirements with Electrical Contractor, Electrical plans and at the site, prior to ordering equipment.

13.3. **Ceiling Mounted Cabinet Fans:** Penn Ventilator Company Model Zephyr, Series Z-3H thru Z-15H with RA right angle arrangement or TDA arrangement as shown on the plans, or approved equivalent, complete with all accessories, including unit mounted solid state speed control switch, factory baked enamel white metal ceiling grille, metal flanged inlet and outlet connections, acoustically insulated metal housing, direct drive, ECM motors, internally isolated centrifugal fan, integral backdraft damper and terminal cap, cast aluminum brick vent, or soffit grille as shown on the plans. Fan wheel must be steel or aluminum. No polypropylene, plastic, polycarbonate or other non-metallic wheels are allowed. Fan must be supported from the structure with 1/4” hanger rods, rubber in shear vibration isolators and Manufacturer furnished bracket for attaching rods to the fan and structure above. Refer to the plan details for additional requirements.

13.4. **Acceptable Manufacturers:** Cook, Greenheck, Penn Barry. Cook is the basis of design.

PART 14. PAD MOUNTED PACKAGED OUTDOOR HEAT PUMP UNITS (PHP)

14.1. **General Description:** One-piece, high efficiency, combination air-to-air, true single zone VAV (not two-speed) heat pump cooling system and auxiliary electric resistance heating system, premium efficiency motors, powered exhaust and powered relief, complete with automatic controls, primary and secondary condensate drainage stub outs for condensate drainage, removable stainless steel IAQ drain pan, factory installed refrigerant monitors and related safeties, condensate line overflow switch in the condensate line and in the

auxiliary drain pan, wired to shut down the unit upon detection of condensate in the auxiliary drain pan or obstruction in the condensate drain line, evaporator coil capillary bulb frostat and powered GFI convenience outlet. All equipment (condenser/compressors) scheduled cooling capacities are based on 95°F ambient temperature. Unit must be provided with color touchscreen interface with USB port to indicate data trending, historical alarm messages, real-time sensor measurements, on board system setpoints and customized reports. The unit must be designed for direct side handling of the conditioned air as shown on the plans. Any unit with arrangement different than shown on the plans requires prior approval from the Architect and the Engineer. The equipment must be shipped completely assembled, pre-charged, piped and wired internally ready for field connections. Units must have heavy-duty metal condenser coil hail guards. The entire unit must be factory wired for single point power connection.

Where units are shown to be located on the roof, do not route power through the curb. Coordinate requirement with the electrical plans and electrical Contractor and provide as specified. All equipment and curbs must be installed level and plumb.

Each unit is specified to be provided with UV-C lights. The unit Manufacturer must coordinate with the UV-C Manufacturer the placement of the UV-C lights within the unit. UV-C lights must be placed in number and location as required by the UV-C device Manufacturer for maximum irradiance. The HVAC unit Manufacturer must provide equipment such that any part subjected to irradiance from the UV lamp system must be shielded from the UV-C light or constructed of a material that is capable of withstanding UV-C exposure levels expected in provided product without degradation.

The Contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans and at the project site, prior to ordering equipment.

14.2. **Quality Control:** The Manufacturer must perform a factory test run of the equipment prior to shipment to verify operational performance as specified and shown on the plans. Certified test results must be included with the complete equipment documentation provided to the Contractor and Owner upon delivery to the project site and included in the Owner's Operating and Maintenance Manuals.

14.3. **Refrigerant Leak Detection System (LDS):** A Leak Detection System (LDS) must be provided in any system that has more than 3.91 lbs. of an A2L refrigerant charge, per safety standard UL 60335-2-40 which consists of one or more refrigerant detection sensors. Equipment with R-454B and charge amounts less than or equal to 3.91 lbs. per circuit, does not require a refrigerant leak detection system or any circulation airflow or ventilation airflow mitigation strategies. **The LDS must be factory-installed for all units.**

When the LDS detects a leak in units with charge amounts greater than 3.91 lbs. per circuit, the following mitigation actions must be automatically initiated until the refrigerant has not been detected for at least 5 minutes:

a. Unit must automatically revert to its outside air economizer mode to deliver 100% outside air in tandem with its associated powered exhaust/relief.
b. The compressor(s) operation must automatically and instantly cease/shutdown.

c. Associated auxiliary electric heat must be instantly and automatically disabled.

14.4. **Testing of Refrigerant Leak Detection System:** The Alabama Department of Construction Management (DCM) requires that the unit manufacturer must provide a factory-trained mechanic, employed by the unit Manufacturer, not a sales representative, onsite the day of the final site visit to test the refrigerant monitoring system and verify proper operation, shutdown, safeties, etc. as required. No beneficial occupancy, substantial completion or certificate of occupancy will be granted by DCM without this testing. Failure to comply with this provision will be cause for cancellation of the site visit and a reinspection fee imposed, with all costs of the re-inspection to be borne by the Contractor.

14.5. **Pad Mounted Supports:** Units shown on finished grade must be provided with factory base rail and anchored to the concrete pad. Concrete pads are specified under Division 2. Where concrete pads are not specified or not shown elsewhere, the Mechanical Contractor must provide a minimum 4" thickness, 5,000-psi concrete pad with rounded edges and corners. Pad must extend a minimum of 12" around three (3) sides of the unit and terminate at the building outside wall. Provide a strip of asphalt expansion joint between the concrete pad and the building exterior wall. Expansion joint must be full width by full depth of concrete pad, 1" thickness, non-absorbing, self-sealing, ASTM D 994 compliant and manufactured by W.R. Meadows Inc. or approved equivalent. All equipment and curbs must be installed level and plumb.

14.6. **Economizer Package:** Each unit must be provided with a 100% outside air economizer. The economizer must be provided complete with all controls, powered exhaust, powered relief and air mixing damper assembly consisting of an enthalpy controller, fresh air, recirculated air and exhaust air dampers and protective guard over relief/exhaust unit discharge. The fresh air intake section must be equipped with 1" thick, washable air filters. The assembly must be mounted within the confine of the unit casing. The system must be interlocked so that when the room thermostat calls for cooling or heating the outside air dampers will return to minimum position.

14.7. **Cooling System:** Total certified cooling capacity must not be less than indicated in the Equipment Schedule with low ambient head pressure controls to 40°F. All compressors must operate with full factory furnished charge of ASHRAE Safety Classification A2L, R-454B refrigerant. Coils must be of non-ferrous construction with aluminum fins mechanically bonded to seamless copper tubes. Condenser coils must have sub-cooling rows. The compressors must be resiliently mounted; have built-in 3-mode crankshaft lubrication, crankcase heater, discharge temperature limiter, current and temperature sensing motor overloads and five-year guarantee. The system must be protected by high and low pressure switches, a five minute compressor timed off cycle controller, head pressure controls, reversing valves, accumulator, defrost control system, locking refrigerant charging valves, etc. as required for complete installation. Compressors over 10-ton capacity must have oil failure switches.

All units with scheduled cooling capacity greater than 60 MBH must be provided with multiple compressors, or 2-stage compressors as required by ASHRAE 90.1. Units with more than one compressor must have complete separate/independent refrigerant circuits to the evaporator. Where dual compressors are required for Manufacturer approved use of the hot gas reheat coil, dual compressors must be provided in lieu of a single, two-stage compressor.

14.8. **Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass and locking tamper resistant caps. This requirement does not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

14.9. **Hot Gas Reheat Coil:** Each unit must be provided with a factory installed (not third party installed) refrigerant hot gas reheat coil with reheat coil valve and located in the reheat position. The coil must be of sufficient size to reheat all of the air supply. Provide, complete, with all necessary valves, controls, etc., as required for a complete and properly functioning installation. Provide manual isolation valves for each hot gas and liquid lines. Furnish for review air conditioning equipment Manufacturer approved refrigerant piping and controls diagram and statement by the air conditioning Manufacturer on company letterhead that use of the hot gas reheat coil with the equipment is acceptable to the Manufacturer and will not affect any warranty or guarantee. **Equipment submittal will not be reviewed without a Manufacturers' approved diagram and referenced statement**. Minimum reheat capacity for supply air must be 10ºF. Maximum coil pressure drop is 0.10” static pressure.

14.10. **Auxiliary Electric Heating System:** The electric heater with all components built in at the factory must carry the UL label. Each coil must have double thermal protection, consisting of a thermal overload Klixon device and heat limiters in the power legs, current sensing relay, transformer and timer delay relay. Provide primary fusing, branch circuit fusing per UL and NEC requirements. If backup contactors are used as secondary thermal overload protection in lieu of the fused elements, these contactors must be built in and prewired at the factory. The resistance wire used in each coil must be 80% nickel and 20% chromium with no iron content. Wire must be supported by ceramic bushings, mounted in galvanized steel frame on not more than 4” centers.

Units with a specified cooling capacity of less than 40 MBH must use the auxiliary resistance heater for reheat. Where the auxiliary resistance heater is specified for maintaining space temperature during dehumidification, the auxiliary resistance heater must be provided in a minimum of two stages.

14.11. **Fans and Motors:** Supply fan must be a direct driven plenum fan with backward curved fan wheel with an external rotor direct drive variable speed motor, not 2-speed. Supply fan speed adjustments must be made using the control user interface and mobile application.

Fan must be provided with fan fail indication. The indication must be registered at the on-board user interface and mobile service application.

Fan motors must be premium efficiency, true variable speed (not 2-speed), direct driven and thermally protected.

All motors with scheduled capacity of less than 1 HP must be ECM type as required by ASHRAE 90.1 and with minimum motor efficiency of 70% when rated in accordance with DOE 10 CFR 431.

All motor ratings, efficiencies, torque, horsepower, service factor, temperature rise, bearing life and performance characteristics specified herein must be fully achieved at a base frequency of 60 Hz or lower. Motors must not rely on operation above 60 Hz to meet any specified performance criteria, nor shall the capability to operate above 60 Hz be used to satisfy the minimum requirements of this Section. This requirement applies to all motors, including those intended for use with variable frequency drives (VFDs).

Provide all necessary controls to operate the unit based on maintaining two temperature setpoints: discharge air and zone temperature. During single zone vav cooling, the unit will maintain zone cooling setpoint by modulating the supply fan speed more or less to meet zone load demand; and the unit will maintain discharge temperature to the discharge cooling setpoint by modulating economizer if available and staging dx cooling.

External static pressure indicated on the plans is estimated. The equipment Manufacturer must provide additional belt sheaves for all belt driven equipment and/or motors, as applicable and as required, to match field conditions for the ductwork as installed.

Condenser fans must be direct driven. All motors must have inherent protection devices on all legs.

14.12. **Ultraviolet (UV-C) Lights:** Mechanical Contractor is responsible for wiring the devices and providing power for the UV-C lights if not shown on the Electrical plans. Air handling units must be provided with power supply and connections within the unit cabinet for powering the UV-C lights. Mechanical Contractor must be responsible for circuitry to UV-C lighting. UV-C lighting must cycle on and off with the fan or operate continuously as recommended by the UV-C lighting Manufacturer.

Comply with UL / C-UL or ETL for Ultraviolet Fixturing. Store UV-C Fixturing in a clean, dry place and protect from weather, construction traffic and construction debris. UV-C products supplier must provide proof of 100% inbound and outbound testing of equipment. The UV-C Power supply must have been tested, listed and labeled as compliant with UL, CSA and CE. The plenum wiring loom must meet UL Subject 13 and UL 1581, Article 725 of the NEC and meet UL VW-1 material ratings. There must be a metallic Loom cladding, and it must be UL recognized DXUZ2 and constructed of flexible galvanized steel and cover the entire Loom. Each lamp must contain no more than 5 milligrams of mercury consistent with current environmental practices. Lamp Watts must be printed on all lamps, no exceptions. Lamps must not produce ozone and must be hermetically sealed within a layer of UV-C transmissible FEP to protect against lamp breakage and to contain lamp contents should breakage occur.

Lamps must be installed in sufficient quantity and in such a manner to provide an equal distribution of UV-C energy. When installed, the UV-C energy produced must be of the lowest possible reflected and shadowed-losses and must produce 360-degree UV-C irradiance from the lamps within the UV cavity. Lamp Watts must be printed on all lamps, no exceptions. Each lamp must contain less than 5 milligrams of mercury, consistent with current environmental practices. Lamp useful life must be a minimum of 9,000 hours with no more than a 15% output loss at the end of the lamp's life (12 months of continuous use). Lamps must be constructed with UV-C resistant bases and must not produce ozone. Lamps must produce the specified output in moving air of up to 1000 fpm and temperatures of 0-200°F. Lamps must be hermetically sealed within a layer of UV-C transmissible FEP to provide protection

against lamp breakage and to ensure Lamp contents from a broken Lamp are contained.

Fixture modeling must be included in the submittal and must contain the necessary calculations to demonstrate that a minimum of 6 lamp watts, as recommended by ASHRAE, are distributed equally to each square foot of coil surface area to achieve a minimum of 100 microwatts per square centimeter equally distributed to the surfaces at the plenum sides, top and bottom. All calculations are to be at 55 degrees F and 500 fpm air velocity, no exceptions.

The power supply housing must be capable of installation within the air stream, secondary compartment or NEMA enclosure. Lamps must be mounted to irradiate the intended surfaces as well as all of the available line of sight airstream through proper placement, 360° irradiation and incident angle reflection.

To protect personnel, all unit access panels and doors to the UV-C assembly and/or within view of the UV-C assembly must include mechanical interlock switches to ensure that the UV-C assembly automatically de-energizes when any equipment access is opened. All UV-C devices must fit and be installed within the unit cabinet. **Devices must be hardwired and UL labeled for the installation. Plug-in devices are not allowed per NEC.** The assembly must be powered by 120v circuit or as required by the AC unit Manufacturer. Coordinate requirement and provide as required.

Provide warning signage on each access point to the UV-C lights and on each side of the unit. Signage materials, methods and colors must be as specified in Section 15010, Part Identification. Signage must read as follows: "***DANGER!! UV-C LIGHT SOURCE! DISCONNECT POWER BEFORE SERVICING UNIT OR UV-C LIGHTING!***" Do not use stick-on signage provided by the UV-C Manufacturer.

14.13. **Frame and Casings:** The frame must be of welded construction. The casing must be constructed of galvanized hinged panels with hinged latching handles and baked on outdoor acrylic finish. The cabinet bottom must be insulated with Styrofoam; cabinet panels must be insulated with 1" fiberglass. All components, wiring and inspection areas must be completely accessible through hinged panels with locking door handles. Unit must be provided with a unit Manufacturer furnished heavy-duty metal condenser coil hail guard.

14.14. **Filters:** Provide 2" thick, MERV 11, pleated, disposable type filters for each filter location equal to Farr Series 30/30 and filter access section. All filters must be common industry standard size filters that are readily available and do not have to be fabricated. Cutting and taping of filter segments to make a proper filter is prohibited. **The Mechanical Contractor must be responsible for quarterly filter cleaning of the outside air intake filter and quarterly replacement of the return air filters during the guarantee period. The Mechanical Contractor must inscribe onto the disposable filters' casing the date filters were installed/replaced.**

14.15. **Indoor Thermostat:** The Manufacturer must provide a combination 7-day programmable, two-stage heating automatic changeover heat pump thermostat. The thermostat must have an outdoor thermistor to compensate for thermostat droop, emergency heat switch with indicator light and auxiliary heat light. Thermostat must have sub-base fan switch for "On-Auto" selection and manual "Heat-Cool" switch. The thermostat must be hardwired and be provided with battery backup. Coordinate the thermostat with specified sequence of operation and provide as required.

Provide hinged metal guard with rounded corners, lock and key for each thermostat.

14.16. **Outdoor Thermostat:** Provide an outdoor thermostat for control of the second stage of electrical heater.

14.17. **Humidistat:** Humidistat is specified in “Automatic Controls” at the end of this 15700 Specification. At his option, the Unit Manufacturer may substitute a combined thermostat/humidistat. Verify with the Controls Sub-Contractor that the furnished thermostat/humidistat will perform all sequences of operation else provide separate devices as specified.

14.18. **Unit Protection:** All equipment must also be provided with equipment manufacturer factory installed surge protection and phase protection to insure against voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling. Where manufacturer factory installed devices are not available, protection must be provided for all 3-phase equipment utilizing ICM Controls Model 450 A Plus+ or equivalent. All single phase equipment with horsepower greater than or equal to 1/8 HP must be provided with protection utilizing ICM Controls Model ICM 492 or equivalent. Where phase protection device cannot be mounted within the respective equipment, provide a NEMA 4x or NEMA enclosure appropriate for the installation. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities.

14.19. **Smoke Detectors:** See Controls at the end of this Section.

14.20. **Factory Start-Up Service:** The Contractor must provide a factory-trained mechanic, employed by the unit Manufacturer and not a sales representative, to check out all equipment, including hot gas reheat coils and UV-C lights and furnish written report indicating equipment is installed in strict accordance with Manufacturer's recommendations. Also, provide temperature, pressure and amp readings taken during testing to substantiate unit performance including the range of the refrigerant hot gas reheat coil valve as applicable.

14.21. **Warranty:** General warranties are specified in Section "General Mechanical Provisions". The Mechanical Contractor and equipment Manufacturer must provide a non-prorated, total of five years replacement warranty for this equipment, to include all parts and components, belts, lubricants, compressors, refrigerant, etc., all labor and shipping of the items required to return the installation to its original operating condition.

The Mechanical Contractor must be responsible for any parts, labor, etc. as specified above that is not provided by the equipment Manufacturer.

The Contractor and/or the Manufacturer must respond within 24 hours upon notification that there has been a failure under the terms of the specified warranty. "Respond" must mean having a Manufacturer certified technician onsite to evaluate the extent of the needed repairs/replacement and ordering of all items required for repair/replacement.

Shipping of the replacement compressor and any other related unit parts must be via maximum 2-day delivery if the unit is inoperable or cannot maintain a minimum indoor temperature of 78ºF to the affected facility.

The warranty period must begin on the date of substantial completion of the installation, as determined by the Architect, and must continue for the full product warranty period specified above.

14.22. **Manufacturers:** Trane Series WHK. Trane is the basis of design. Equivalents by Carrier or Lennox will be considered.

PART 15. SPLIT SYSTEM CASSETTE TYPE HEAT PUMP (CCHP)

15.1. **General:** The heat pump air conditioning system must be equal to Trane/Mitsubishi Electric Series PLA/RUZ split system operating full factory furnished charge of ASHRAE Safety Classification A2L, R-454B refrigerant. The system must consist of a slim silhouette; compact ceiling mounted packaged evaporator section and matching slim line outdoor unit with lockable refrigerant charging valves, factory installed refrigerant monitors and related safeties, refrigerant piping sweat/brazed connections from the Manufacturer, wall mounted, hardwired 7-day programmable thermostat with clear plastic locking cover, occupancy sensor with override, outside air connection (if shown on the plans) and supply air connection (if shown on the plans). whenever possible, the unit must fit within a nominal 2'x2' lay-in ceiling grid. Flare connections are not allowed unless **specifically** required by the Manufacturer. The units must be listed by Electrical Laboratories (ETL) and/or Underwriters Lab (UL) and bear the ETL and/or UL label. All wiring in accordance with the National Electrical Code (N.E.C.). The units must be rated in accordance with ARI Standard 240 and bear the ARI label. All units must be provided with phase protection.

Where the indoor unit is powered by the outdoor unit, installation must be as specified in Division 16.

All condensate and refrigerant piping that cannot be concealed in the walls in finished spaces must be provided with Mitsubishi Line-Hide Linset Cover System. Note that this provision must not be used to cover piping that can be otherwise concealed.

15.2. **Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass and locking tamper resistant caps. This requirement does not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

15.3. **Occupancy Sensor:** Provide I-see Sensor' occupancy sensor.

15.4. **Refrigerant Piping:** Coiled line sets and preinsulated line sets are not allowed. See other parts of 15700 for piping and insulation requirements. The Equipment Manufacturer must size all refrigerant piping per ASME B31.5 (Refrigeration Piping and Heat Transfer Components), ASHRAE Standard 15 (Safety Standard for Refrigeration Systems) and all applicable codes and standards. The Manufacturer and Contractor must furnish all required accessories and auxiliaries for a complete installation in accordance with the drawings and specified sequence of operation.

The Contractor must submit a manufacturer approved refrigerant piping diagram prior to installation. Failure to provide the approved diagram must make the Manufacturer and Contractor solely responsible for correcting any resulting issues at no additional cost to the Owner. Refer to Section Refrigerant Piping and Accessories for additional requirements. **Piping connections must be brazed/sweat connections** from the Manufacturer's factory. Flare connections are not allowed unless **specifically** required by the Manufacturer. Refer to Section Refrigerant Piping and Accessories for additional requirements.

15.5. **Description:** Capacities and characteristics must be as specified on the drawings. The indoor unit must be factory assembled and wired. The casing must be galvanized sheet metal with insulation. Whenever possible, the unit must fit within a nominal 2'x2' ceiling grid. Coordinate unit type required with previously specified requirements of outside air/supply air duct connections required by the plans. The evaporator fan must be a high performance, fan direct driven by a single motor. The fan must be statically and dynamically balanced and run on permanently lubricated bearings. The indoor unit must have an adjustable air outlet system with 4-way deflection airflow. Return air must be filtered with factory furnished filter. The coil must be of nonferrous construction with smooth plate fins bonded to copper tubing. All tube joints must be brazed with phos-copper or silver alloy and provided with appropriate **piping connections for brazed/sweat connections from the Manufacturer's factory**. Flare connections are not allowed unless **specifically** required by the Manufacturer. The coil must be pressure tested at the factory. A condensate pan and auxiliary drain pan must be provided and extend under the coil and piping.

Unit must be provided with sensor to shutdown unit and sound alarm if condensate line becomes obstructed. If the BAS system is part of the project, provide output contacts to show alarm at BAS system Operator Console. Coordinate with BAS Contractor and provide as required for proper interface.

The control system must consist of low voltage room thermostat to control heating and cooling. Provide clear plastic thermostat guard with lock and key.

15.6. **Condensate Drainage:** Refer to Part Condensate Drainage Piping of this specification for drainage requirements. Note that ductless mini-split equipment that produces condensate must be provided with an inline check valve located in the drain line or a trap as required by IMC 307.2.4.1.

15.7. **Outdoor Unit:** Must be completely factory assembled, piped and wired. The unit must be furnished with one (1) direct drive, propeller type fan arranged for horizontal or vertical. The motors must have inherent protection, be of the permanently lubricated type and resiliently mounted for quiet operation. The compressor must be of the high-performance rotary type with crankcase heater, accumulator and internal thermal overloads. The refrigeration system must be equipped with high-pressure switch. Refrigerant flow from the condenser must be controlled by means of a capillary tube. The condenser coil must be of nonferrous construction with smooth plate fins bonded to copper tubing. The coil must be protected with smooth plate fins bonded to copper tubing. The condenser coil must be protected with an integral heavy-duty metal hail guard. The unit must be controlled by the microprocessor located in the indoor matching unit. A built-in, low-ambient controller must allow cooling to 0 degrees F outdoor temperature.

15.8. **Power Wiring Connection:** Coordinate wiring requirements (separate power for each indoor and outdoor unit or indoor unit powered by outdoor unit) with the equipment manufacturer and provide as required.

Where the indoor unit is powered by the outdoor unit, the contractor must provide and install a specialized Type MC Mini-Split cable (Southwire EZ-IN or approved equivalent) for all interconnecting power and control wiring between indoor and outdoor HVAC units. Cable must consist of four (4) stranded Class B compressed copper conductors. Each conductor must be insulated with heat-resistant Polyvinyl Chloride (PVC) and a protective Nylon sheath (Type THHN/THWN). The assembly must be protected by a 25/50 smoke/flame rated lightweight, interlocking aluminum armor and finished with a sunlight-resistant, flame-retardant and moisture-resistant black PVC outer jacket. Cable must be UL listed for 600V, rated for 195°F dry and 170°F wet locations and approved for direct burial and installation without conduit in both indoor and outdoor environments. Installation must comply with NFPA 70 (National Electrical Code) Article 330. Coordinate furnishing and installation of the cable requirement with the electrical contractor prior to ordering/installing the cable.

15.9. **Indoor Thermostat:** The manufacturer must provide a combination 7-day programmable, two-stage heating automatic changeover heat pump thermostat. The thermostat must have outdoor thermistor to compensate for thermostat droop, emergency heat switch with indicator light and auxiliary heat light. Thermostat must have sub-base fan switch for “On-Auto” selection and manual “Heat-Cool” switch. The thermostat must be hardwired and be provided with battery backup. Coordinate the thermostat with specified sequence of operation and provide as required.

Provide hinged metal guard with rounded corners, lock and key for each thermostat.

15.10. **Pad Mounted Supports:** Units mounted on finished grade must be provided with concrete pad. Concrete pads are specified under Division 2. Where concrete pads are not specified or shown elsewhere, the Mechanical Contractor must provide a minimum 4” thickness, 5,000-psi concrete pad with rounded edges and corners. Pad must extend a minimum of 12” around three (3) sides of the unit and terminate at the building outside wall. Provide a strip of asphalt expansion joint between the concrete pad and the building exterior wall. Expansion joint must be 1” thickness, non-absorbing, self-sealing, ASTM D 994 compliant and manufactured by W.R. Meadows Inc or equivalent.

15.11. **Unit Protection:** All equipment must also be provided with equipment manufacturer factory installed surge protection and phase protection to insure against voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling. Where manufacturer factory installed devices are not available, protection must be provided for all single phase equipment with horsepower greater than or equal to 1/8 HP utilizing ICM Controls Model ICM 492 or equivalent. Where phase protection device cannot be mounted within the respective equipment, provide a NEMA 4x or NEMA enclosure appropriate for the installation. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities.

15.12. **Warranty:** General warranties are specified in Section "General Mechanical Provisions". The Mechanical Contractor and equipment Manufacturer must provide a non-prorated, total of five years replacement warranty for this equipment, to include all parts and components, belts, lubricants, compressors, refrigerant, etc., all labor

and shipping of the items required to return the installation to its original operating condition.

The Mechanical Contractor must be responsible for any parts, labor, etc. as specified above that is not provided by the equipment Manufacturer.

The Contractor and/or the Manufacturer must respond within 24 hours upon notification that there has been a failure under the terms of the specified warranty. "Respond" must mean having a Manufacturer certified technician onsite to evaluate the extent of the needed repairs/replacement and ordering of all items required for repair/replacement.

Shipping of the replacement compressor and any other related unit parts must be via maximum 2-day delivery if the unit is inoperable or cannot maintain a minimum indoor temperature of 78ºF to the affected facility.

The warranty period must begin on the date of substantial completion of the installation, as determined by the Architect, and must continue for the full product warranty period specified above.

15.13. **Manufacturers:** Trane or equivalent by Mitsubishi, Lennox, LG or Carrier. **Trane is the basis of Design.**

PART 16. AUTOMATIC CONTROLS

16.1. **General:** Furnish and install a complete system of automatic temperature controls, as specified herein, as shown on the Drawings and as required for a complete installation. All temperature control equipment must be of electric type. All specified Sequences of Operation are subject to all equipment built-in safety requirements. Equipment and safety requirements must not be overridden.

16.2. **Submittals:** The temperature control Contractor must submit a complete set of temperature control diagrams with written "sequence of operation" and factory-printed specification data sheets covering each control device proposed to be used for Engineer's review prior to installation of any equipment or part of system. Submittal data must include a schedule of all devices to be installed.

16.3. **Installation:** By trained and experienced mechanics. All work must be provided by an approved, independent HVAC Controls Contractor whose primary business is the installation and servicing of HVAC controls systems. The HVAC Controls Sub-Contractor must have an adequate service facility to provide complete service and maintenance of the facility within 100 miles of the installation.

16.4. **Identification:** Provide permanent nameplates for all control components and for all motor starters. Nameplates must be engraved laminated plastic with sufficiently large letters to be legible under normal operating conditions. Refer to Section 15010, Part Identification for additional requirements, nameplate materials, etc.

16.5. **Conduit, Controls Wiring and Instrumentation Cable:** The HVAC Controls Contractor must be responsible for the furnishing and installation of a complete and functional system as specified, shown on the plans and as required to accomplish the specified sequences of operation.

All HVAC control cabling and wiring must be in EMT conduit (no “whips”) or on J-hooks. Above accessible lay-in ceilings, control wiring must be installed on J-Hook assemblies. Above all hard, inaccessible ceilings, in all mechanical rooms and in areas with exposed structure (no ceilings), controls wiring must be in conduit. Do not attach any wiring, cabling or conduits to refrigerant piping.

Do not route control wiring through sleeves containing piping. Do not route control wiring through sleeves containing piping. **All control wiring penetrating any exterior wall, interior partition, floor and similar construction must be in EMT conduit. Through base control wiring/conduit is not allowed.** EMT control conduit must be as specified in the Electrical Division of the specifications and/or as shown on electrical drawings. Minimum HVAC Controls conduit size must be 3/4” in size. All control conduit, power, relays, contactors, transformers, wiring, etc., required for a complete functional system as specified, shown on the plans, or as required to accomplish the specified sequences of operation, which is not shown or specified by the Electrical Division, must be furnished and installed by the HVAC Controls Contractor. This must include all power, interlock control wiring between the various components of the heating, ventilating and air conditioning system, lighting interlocks and all smoke detection system electrical wiring.

Instrumentation cable must be minimum AWG as specified or heavier AWG as recommended by the controls system Manufacturer.

All thermostat and humidistat boxes must be mounted 46” A.F.F. to the center of the box (ADA height).

16.6. **Space Thermostats:** Space thermostats must be 7-day programmable, microprocessor based, low voltage type with “Heating - Cooling” and fan “On-Off-Auto” switches sub-base. Coordinate thermostat requirements and options with Mechanical Contractor and provide as required to accomplish specified sequence of operation. Each thermostat must have building power supply with transformer and battery back-up power.

Provide hinged metal guard with rounded corners, lock and key for each thermostat.

All thermostat boxes must be mounted 46” A.F.F. to the center of the box (ADA height). All thermostat boxes in walls or partitions must be sealed/caulked to prevent the passage of air and smoke through the device.

16.7. **Humidistats:** Heavy-duty industrial type. Provide metal guard as specified for thermostats.

All humidistat boxes must be mounted 46” A.F.F. to the center of the box (ADA height). All humidistat boxes in walls or partitions must be sealed/caulked to prevent the passage of air and smoke through the device. At his option, the unit Manufacturer/Controls Sub-Contractor may provide a combined thermostat/humidistat device. Coordinate requirement with the equipment manufacturer prior to bidding and provide as required.

16.8. **Smoke Detectors:** The Mechanical Contractor must coordinate the placement of smoke detectors with the Electrical Contractor. Smoke detectors operating on photoelectric principles must be furnished by the Electrical Contractor and installed where shown on the Mechanical plans by the Electrical Contractor. The Electrical Contractor must wire the detectors and the Mechanical Contractor must coordinate to verify shutdown of the respective unit upon smoke detection. Provide required interlocks, wiring, relays, etc., to stop the unit upon detection of smoke by the smoke detectors. Coordinate work with Electrical Contractor and provide all as required.

The Mechanical Contractor must provide an access door/panel, watertight where required, adjacent to each smoke detector to allow for maintenance and visual inspection. Access panels must be as specified hereinbefore.

16.9. **Condensate Drainage:** Refer to Part Condensate Drainage Piping of this specification for drainage requirements.

16.10. **Motorized Control Dampers:** Equal to Ruskin Series CD-50, Pottorff CD-52, Greenheck VCD-43, United Enertech CD-110 or Nailor 2020, galvanized steel frame, Class 1A (less than or equal to 3 cfm/sq.ft. at 1" w.g.) leakage, extruded aluminum airfoil, opposed blade dampers, stainless steel or synthetic bearings with heavy-duty Belimo actuator and 24-volt actuators. The dampers must be labeled by an approved agency when tested in accordance with AMCA 500D.

Coordinate power requirements with electrical Contractor and provide as required. Damper motors must be located outside of the air stream. Provide weatherproof construction for outdoor installation of dampers and weatherproof enclosure.

16.11. **Typical Packaged Heat Pump Unit (PHP) Systems Sequence of Operation:** The control circuit for each unit must be energized by its respective 7-day programmable thermostat. Occupied and unoccupied schedules must be programmed by the Controls/Mechanical Contractor as desired by the Owner.

The thermostat must be used to control heating and cooling. Provide for each heat pump unit an adjustable outdoor thermostat and wire to control the second stage of the auxiliary electric resistance heater.

Upon a call for the occupied schedule, the outside air damper must open to its minimum scheduled outside air setpoint and the respective indoor/outdoor unit must start. Upon indoor/outdoor unit shutdown, the motorized outside air damper must close.

Upon a call for the unoccupied schedule, the outside air damper must remain closed and the respective indoor/outdoor unit must start.

Provide a space humidistat to override the cooling thermostat to provide for dehumidification.

During dehumidification, the heat pump unit reversing valve must be locked out to prevent switching to the heating mode and the compressor must be commanded on for cooling. The space thermostat must then modulate the refrigerant hot gas reheat coil valve or energize the first stage of the 2-stage heater, as specified above, to maintain the required space temperature.

The Mechanical Contractor must coordinate the placement of smoke detectors with the Electrical Contractor. Smoke detectors operating on photoelectric principles must be furnished by the Electrical Contractor and installed where shown on the Mechanical plans by the Electrical Contractor. The Electrical Contractor must wire the detectors, and the Mechanical Contractor must coordinate to verify shutdown of the respective unit upon smoke detection. Provide required interlocks, wiring, relays, etc., to stop the unit upon detection of smoke by the smoke detectors. Coordinate work with Electrical Contractor and provide all as required.

16.12. **Exhaust Fan (EF) Controls:** Provide interlocks for certain fans as noted on fan schedule, including lighting interlocks if not shown on electrical.

16.13. **Time Delay Controls:** Provide time delay control systems as required to stage units starting to prevent more than three units from starting at the same time.

16.14. **Miscellaneous Controls:** Provide all other miscellaneous controls, wiring, dampers, valves, etc., as required for a complete functional control system.

16.15. **Service and Guarantee:** After completion of the installation, adjust all control equipment and place the complete system in operation subject to the review of the Engineer. Guarantee the control system to be free of defects and adequate to provide required control functions for a period of one year after acceptance of project. Provide free service and maintenance during the guarantee period.

END OF SECTION

DIVISION 16

ELECTRICAL

Prepared by Kenneth R. Gunn Jr. P.E.

SECTION 16100

ELECTRICAL

PART 1 - GENERAL

1.01. RELATED DOCUMENTS:

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

1.02. QUALIFICATIONS OF ELECTRICAL CONTRACTORS:

A. Electrical contractor must be properly established as an electrical contractor by the State of Alabama. Electrical contractor shall have had previous experience in the satisfactory installation of at least three systems of this type and size in the State of Alabama.

1.03. CODES, PERMITS AND INSPECTIONS:

A. Comply with applicable laws of the community, with latest edition of National Electrical Code (NEC), NFC 70, and the International Building Code(IBCC) or the edition adopted by the local authority having jurisdiction, where not in conflict with those laws, and with the service rules of the local utility company.

B. Obtain and pay for all permits and deposits and arrange for inspections as required.

C. After completion of the work, submit certificate of final inspection and approval from the local electrical inspector, certifying that the installation complies with all regulations governing same.

1.04. MATERIALS:

A. All materials shall be new, and UL approved where a standard has been established.

B. Manufacturers' names and model numbers shown on the plans and in the specifications are given to indicate the type and general quality of items to be provided. Equal products by other manufacturers will be accepted.

C. Material substitutions will be considered only when evidence of equality and suitability, satisfactory to the Architect/Engineer has been presented in writing, with samples if requested by the Architect/Engineer. All prior approvals must have the approval of the engineer of record at the offices of Gunn and Associates, P.C. located at 3102 Highway 14, Millbrook, AL 36054, Phone: 334-285-1273

D. All proposed substitutions shall be approved in writing at least ten (10) days prior to the bid date.

E. It shall be understood that the Architect/Engineer has the authority to reject any material or equipment used which is not specified or approved, or showing defects of manufacture or workmanship, before or after such material or equipment is installed.

1.05. WORKMANSHIP:

A. Execute all work so as to present a neat and workmanlike appearance when completed.

1.06. DESCRIPTION OF WORK:

A. Furnish all labor and materials required to complete the electrical work indicated on the drawings or herein specified. Major work included in Section 16 shall be:

B. Prior to bid it is the contractor's responsibility to re-affirm with the power company the service requirements to the facility as indicated on the electrical drawings. If any changes or additions to the service lateral installation indicated on the drawings is required by the utility company the contractor shall include the cost of these changes in his/her bid. Additionally, any/all charges

for electrical service to the facility (aid-to-construction) by the utility company shall be included in the contractor's bid price.

C. Remove or relocate all electrical or electronic services located on or crossing through the project property, either above or below grade, which would obstruct the construction of the project or conflict in any manner with the complete project or any code pertaining thereto.

D. Furnish and install a complete electrical light and power system including but not limited to the connection of all meters, switchboards, panelboards, circuit breakers, power outlets, convenience outlets, lighting fixtures, switches, and/or other equipment forming part of the electrical system.

E. Furnish and install a complete system of outlet boxes, face plates, conduit raceways, backboard, and service entrance conduit for the communications system.

F. Furnish and install a complete system of outlet boxes, face plates, conduit raceways, Category 6 cables, backboards, patch panels, and fiber optic cables and patch panels for the Data System.

G. Connect all electrical equipment whether furnished by this contractor or by others.

H. Furnish and install all disconnect switches not included as an integral part of equipment.

I. Furnish complete buss or busway assemblies where indicated.

J. Furnish and install a complete Lighting Control System.

K. Complete the alterations, additions, and renovations to the electrical system in the existing building as specified herein or as shown on the drawings.

L. Procure and pay for permits and certifications as required by local and state ordinances and Fire Underwriters certificate of inspection.

M. Visit the site and determine conditions that affect this contract. Failure to do so will in no way relieve the Contractor of his responsibility under his contract.

N. Submit to the Architect a certificate of final inspection from local and/or state inspection authorities.

O. Establish and maintain temporary electrical services for construction purposes.

1.07. DRAWINGS AND SPECIFICATIONS:

A. This Contractor shall examine drawings and Specifications relating to the work of all trades and become fully informed as to the extent and character of work required and its relation to all other work in the project prior to submission of bid and prior to the start of any construction.

B. Drawings and Specifications shall be considered as complementary each to the other. What is called for by one shall be as binding as if called for by both. Where conflicts occur, secure clarification from the Architect in advance of bidding; otherwise incorporate the more stringent conditions into the bid price.

C. Omissions from the drawings and specifications or the mis-description of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omissions and details of work; they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

D. The drawings indicate diagrammatically the extent, general character, and the approximate location of the work to be performed. In the interest of clearness, the work is not always shown to scale or exact location. Check all measurements, locations of conduit, fixtures, outlets, and equipment with the detailed architectural, structural, and mechanical drawings, and lay out work so as to fit in with ceiling grids, ductwork, sprinkler piping and heads, and other parts. Take finished dimensions at the job site in preference to using scale dimensions.

E. Where the work is indicated but with minor details omitted, furnish and install the work complete so as to perform its intended functions.

F. Where doubt arises as to the meaning of the plans and specifications, obtain the Architect's decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.

G. Except as noted above, make no changes in or deviations from the work as shown or specified except on written order of the Architect.

1.08. EXISTING CONDITIONS:

A. Before submitting a bid, visit the site and ascertain all existing conditions.

B. Make such adjustments in work as are required by the actual conditions encountered.

C. No consideration will be given after bid opening for alleged misunderstandings regarding utility connections, integration of work with existing system, or other existing conditions.

1.09. SUBMITTALS:

A. Follow procedure outlined in Division 1.

B. Submittals shall be bound together and shall include a coversheet indicating the following:
   1. Project name
   2. Trade contractor's name
   3. Supplier's name
   4. Name and phone number of supplier's contact person
   5. A list of each item submitted with manufacturers' names and model numbers.

C. Within 20 days of award of contract and prior to beginning any work on the project submit six (6) copies of manufacturer's drawings/data sheets for the following items to the Engineer for review:
   1. Conductors
   2. Cable Pulling tensions. Provide cable pull tension calculations (lateral and longitudinal) on all underground cable runs over 150 feet for cables sized #1 and larger. Provide one line diagram indicating pulling tensions on each run and number and size of each pull box along anticipated route. Calculations shall include changes in direction or elevation of feeder runs.
   3. Wiring Devices
   4. Conduit Wrapping Tape
   5. Switchboards
   6. Panelboards
   7. Power system breaker coordination. Submit proper breaker settings recommendations with breaker coordination study.
   8. Contractor shall coordinate with mechanical/plumbing shop drawings prior to submitting power package to engineer. Adjust overcurrent devices accordingley.
   9. Disconnect Switches
   10. Dry Type Transformers
   11. Fire Stopping
   12. Lighting Control System: Include conduit and cable layout, terminal to terminal wiring showing color code and wire numbers, and complete technical data on each system component. Furnish the Owner one set of as built drawings at completion of the project. Coordinate with lighting control riser on drawings for further shop drawings requirements.
   13. Lighting Fixtures (include photometric data for each fixture)
   14. Fixture Support Equipment
   15. Secondary Surge Arresters
   16. Transient Voltage Surge Suppressors(Surge Protective Devices)
   17. J-Hooks

D. Submit samples upon request.

E. The Contractor is responsible for verifying all quantities and for verifying and coordinating dimensional data with the available space for items other than the basis of design.

F. **Provide a ½"= 1'- 0" scale drawing of all electrical rooms containing more than a single panelboard section or containing a panelboard and other electrical and/or mechanical equipment. These drawings shall be submitted along with equipment data sheets. Note we will no longer review submittals that does not have this information. Any delay will be the responsibility of the contractor for not submitting these drawings of the electrical rooms. Power submittals will be returned rejected without these drawings.**

G. The contractor shall review and approve or make appropriate notations on each item prior to submittal to the architect. Submittals without contractor's approval will be rejected.

H. Submittal reviews will be performed up to two times to review material submitted by contractor. Gunn & Associates will charge a review fee of a $1,000 to review submittals starting the third time submitted. If contractor needs Gunn & Associates, P.C. to perform another review of material after submittals have been submitted and approved to change manufacturers. A review cost of $1,000 per review. Payment must be received by Gunn & Associates prior to scheduling any additional reviews.

1.10. COORDINATION OF SERVICE WITH OTHER TRADES:

A. It shall be the responsibility of the Electrical Contractor to coordinate the electrical service characteristics to each piece of electrically operated equipment with all trades providing electrically operated equipment.

B. Within ten (10) working days of notification to proceed with construction from the Architect, the Electrical Contractor shall notify, in writing, all trades providing electrically operated equipment the characteristic of the electrical power being supplied to each piece of electrically operated equipment.

C. A copy of this notification shall be provided to the General Contractor and the Architect.

D. Be informed as to equipment being furnished by other trades, but not liable for added cost incurred by equipment substitutions made by others which require excess electrical wiring or equipment above that indicated on drawings or specified.

E. The contractor providing the equipment shall be responsible for the additional costs.

1.11. PROGRESS OF WORK:

A. Schedule work as necessary to cooperate with other trades, Do not delay other trades. Maintain necessary competent mechanics and supervision to provide an orderly progression of the work.

1.12. PROTECTION OF PERSONS AND PROPERTY DURING CONSTRUCTION:

A. Take all precautions necessary to provide safety and protection to persons and the protection of materials and property.

B. Protect items of equipment from stains, corrosion, scratches, and any other damage or dirt, whether in storage, at job site or installed. No damaged or dirty equipment, lenses, or reflectors will be accepted.

C. Live panelboards, outlets, switches, motor control equipment, junction boxes, etc., shall be protected against contact of live parts and conductors by personnel.

1.13. CLEANING UP:

A. During the progress of work, keep the Owner's premised in a neat and orderly condition, free from accumulation of debris resulting from this work. At the completion of the work, remove all material, scrap, etc. not a part of this Contract.

1.14. AS-BUILT DRAWINGS, AND OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Prior to the Final Acceptance Inspection the Contractor shall turn over to the Architect one set of reproducible "as built" drawings, including corrected fire alarm system shop drawings, three (3) sets of all equipment catalogs and maintenance data, manufacturers' warranties, and three (3) sets of shop drawings on all equipment.

1.15. TESTING:

A. Upon completion of the work, conduct a thorough test in the presence of Architect or his representative, and demonstrate that all systems are in perfect working condition.

1.16. INSPECTIONS:

A. The contractor shall have all systems ready for operation and an electrician available to remove panel fronts, coverplates, fixture doors, etc., at the final inspection and any other scheduled inspections.

B. It is the contractor's responsibility to have the job ready for inspections when they are scheduled. We will perform inspections as required by our contract. If project is not ready during inspection and requires a re-inspection by Gunn & Associates, then the contractor shall pay Gunn & Associates, P.C. for the re-inspection. The payment shall be made directly to Gunn & Associates, P.C. in the amount to be determined by engineer. Not to exceed $1,500 for single re-inspection fee. Payment must be received by Gunn & Associates prior to scheduling re-inspection.

C. Inspections for Temporary or Permanent Power required by any utility companies are not in our scope of work. If contractor needs Gunn & Associates, P.C. to perform inspections, contractor must include an inspection cost of $1,000 per inspection in their base bid. Payment must be received by Gunn & Associates prior to scheduling inspection.

1.17. DEMONSTRATION:

A. By on-off, stop-start operation, demonstrate to the Owner or his representative, the use, working, resetting, and adjusting of each and every system. Submit statement initialed by the Owner that such demonstration has been made.

1.18. WARRANTY:

A. Warrant the entire electrical system in proper working order. Replace, without additional charge, all work or material that may develop defects (ordinary wear and tear or damage resulting from improper handling excepted) within a period of one year from date of final to general contractor. Provide the owner with two bound copies of all manufacturers' warranties.

B. Data and Telecommunications system cabling shall be warranted for a minimum of 15 years.

1.19. TEMPORARY SYSTEMS:

A. The Electrical Contractor shall be responsible for furnishing and installing equipment and materials necessary for providing electrical power and lighting where needed for the construction of the project.

B. Electrical Contractor will 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. General Contractor shall be responsible for all monthly utility cost for duration of project or date of substantial completion.

1.20. SERVICE INTERRUPTION CLEARANCE WITH OWNER:

A. Before submitting a proposal, check with the Owner concerning interruption of service to the existing electrical systems. No interruption shall be made except at such time and for such duration as approved by the Owner. The Contractor's bid shall include all necessary over-time and weekend work.

1.21. DEFINITIONS:

"AWG" - American Wire Gauge

"ADA" – Americans with Disabilities Act
"As required" - Any and all items required to complete the installation of an item so as to perform its intended function.
"Circuiting" - Conductors, raceways, raceway fittings, and associated hardware.
"EMT" – Electrical Metallic Tubing, "thin wall"
"IBC" – International Building Code
"Install" - furnish, install, and make all necessary connections to and/or for the item(s) indicated or specified.
"NEC" - National Electrical Code, ANSI/NFPA 70, latest edition or the edition adopted by the authority having jurisdiction.
"Necessary" - Any and all items required to complete the installation of an item so as to perform its intended function.
"NEMA"- National Electrical Manufacturers' Association
"NFPA" - National Fire Protection Association
"PVC Conduit" – Rigid Nonmetallic Polyvinyl Chloride conduit
"RGS Conduit" – Rigid galvanized steel conduit
"UL" - Underwriters' Laboratories, Inc.

PART 2 - MATERIALS

2.01. GENERAL:

A. This section includes all basic materials for raceways, fittings, busways, conductors, panelboards, switchboards, lighting fixtures and accessories, etc., as required for a complete installation.

B. All materials shall be new and listed by the Underwriters Laboratories. Material substitutions will be considered only when evidence of equality and suitability, satisfactory to the Architect has been presented in writing, with samples if requested by the Architect.

C. It shall be understood that the Architect/Engineer has the authority to reject any material or equipment used which is not specified or approved, or showing defects of manufacture or workmanship, before or after such material or equipment is installed.

2.02. CONDUITS:

A. Rigid Metal (Galvanized Steel-RGS) Conduit: Rigid metal conduit shall be mild steel piping, galvanized inside and outside, and conform to ASA Specification 080.1 and Underwriters' Laboratories Specifications. By Sprang, Republic, Wheatland, Triangle or Pittsburgh.

B. Intermediate Metal Conduit (IMC): IMC shall be hot dipped galvanized inside and outside and manufactured in accordance with U.L. Standard #6 or #1242. By Allied or approved equal.

C. Electrical Metallic Tubing (EMT): EMT shall be high grade steel electro-galvanized outside and lacquer or enamel coating inside and conform to ASA Specifications 080.1 and Underwriters' Laboratories Specifications. By Sprang, Republic, Wheatland, Triangle or Pittsburgh.

D. Rigid Nonmetallic Conduit (PVC): PVC conduit where exposed shall be high impact Schedule 80; below grand and below or in slab PVC shall be of high impact Schedule 40 PVC and shall conform to Underwriters' Laboratories Standard UL-651. By Carlon, Kraley Pittsburgh, R.G. Sloan or Southwestern.

E. Rigid Aluminum: Rigid Aluminum conduit shall be manufactured from 6063, t-1 aluminum alloy and shall meet the requirements of Federal Spec. WW-C-540c and ANSI C80.5 and shall be U.L. listed in accordance with UL-6. Equal to products by V.A.W. of America.

2.03. COUPLINGS, FITTINGS, AND CONNECTORS:

A. RGS & IMC: By Appleton, Crouse-Hinds, Efcor, O-Z/Gedney, Raco, or Republic.

B. EMT: EMT fittings shall be all steel type setscrew or insulated throat compression type. Pressure indented or slip fit type will not be accepted. All connectors to be insulated. By Appleton, Efcor, Raco Steel City, or Thomas & Betts.

C. PVC: PVC fittings shall be of high impact PVC Schedule 40 or Schedule 80 to match the installed conduit. Joints shall be made with PVC solvent cement as recommended by manufacturer. By Pittsburgh, R.G. Sloan or Carlon.

D. Rigid Aluminum: Fittings used with Rigid Aluminum conduit shall be formed of the same alloy as the conduit or shall be copper free cast aluminum unless specifically indicated otherwise.

2.04. CONDUIT BODIES:

A. Conduit bodies shall be malleable iron except in kitchen, dishwashing, and waste water treatment areas conduit bodies shall be copper free cast aluminum with stamped aluminum covers.

B. Covers shall be screw retained with wedge nut or threaded body. Covers on bodies installed outdoors shall be approved and rated for installation outdoors.

C. Bodies shall comply with NEC 370 and 373.

D. RGS & IMC: By Appleton, Crouse-Hinds, Efcor, O-Z/Gedney, Raco, or Republic.

E. Conduit cannot be used as ground. Provide separate insulated green grounding wire.

2.05. BUSHINGS:

A. Bushings up to and including 1” shall have a tapered throat.

B. Bushings 1-1/4" and larger shall be the insulating type.

C. Grounding bushings shall be specification grade insulated grounding type bushings with tin plated copper grounding saddles and shall be equal to O-Z/Gedney Type BLG or HBLG.

D. Bushings shall be zinc plated malleable iron or copper free cast aluminum.

E. Bushings for terminating Data, Telecommunications, control, CATV, and similar conduits above ceilings and at backboards may be PVC or Polyethylene insulating bushings equal to those manufactured by Arlington Industries and Bridgeport Fittings.

2.06. EXPANSION FITTINGS:

A. Conduit Expansion Joints shall be UL Listed.

B. Expansion joints in rigid metal conduits shall consist of a threaded malleable iron body, pressure bushing, watertight packing, pressure ring, gasket, insulating bushing, and external grounding jumper, and shall be equal to O-Z Gedney Type AX with Type BJ bonding jumper.

C. Expansion joints for EMT conduit shall be same as above with additional EMT couplings and connectors and shall be equal to O-Z Gedney Type TX with Type BJ bonding jumper.

D. Expansion joints in PVC conduit shall be equal to Carlon Series E945.

E. Expansion joints shall provide a minimum of 4” of conduit movement.

2.07. BELOW GRADE THRU WALL WATER SEALS:

A. Thru wall water seals for conduits penetrating exterior below grade concrete walls shall be seal systems by O-Z/Gedney or The Metraflex Company.

B. Thru wall water seals for conduits penetrating exterior below grade concrete walls shall be Metraseal thru wall water seals by The Metraflex Company.

2.08. CONDUIT ACCESSORIES:

A. Conduit clamps and supports for metallic conduit shall be galvanized steel by Efcor, Steel City, or Mineralac. Conduit fittings by Appleton, Crouse-Hinds, O-Z/Gedney, Pyle-National or approved equal.

B. Conduit clamps and supports for nonmetallic conduit shall be nonmetallic high impact PVC by Carlon, Pittsburg, or Sloan.

C. Conduit clamps for aluminum conduits shall be stainless steel or cast copper free aluminum with stainless steel fasteners.

2.09. FLEXIBLE CONDUIT:

A. Liqudtight flexible metal conduit:
   1. Neoprene-jacketed liquidtight flexible metal conduit.
   2. Equal to Anaconda Sealtite.

2.10. ELECTRICAL TAPES:

A. General use electrical tape shall be 8 mil (.008") thick, minimum, premium grade, pressure sensitive, flame retardant, vinyl electrical tape meeting UL 510, ASTM-D-3005, and MIL-I-24391C. The tape shall be equal to 3M No. 88 or Plymouth Premium 85 CW.

B. Rubber tape used as primary tape shall be a 30 mil (.030") thick, minimum self-amalgamating, low voltage rubber tape rated for use through 600 V. Rubber tape shall be equal to 3M No. 2150 or Plymouth 122 Rubber Tape.

C. Electrical filler tape shall be a 125 mil (.125") thick, minimum, self-amalgamating, low voltage insulating compound rated for use through 5 kV. Filler tape shall be equal to 3M SCOTCHFILL or Plymouth 125 Electrical Filler Tape.

2.11. PIPE WRAPPING TAPE:

A. Pipe wrapping tape shall be a 10 mil (.010") thick, minimum, pressure sensitive, vinyl tape manufactured for pipe wrapping applications.

B. The tape shall be UV, bacteria, and fungus resistant.

C. The manufacturer's name and tape type shall be printed on the back of the tape.

D. Pipe wrapping tape shall be equal to Plymouth Rubber Co. PLYWRAP 11, or 3M No. 50.

2.12. WIRE NUTS:

A. Wire nuts for conductor splicing shall be winged type connectors with a square, plated steel spring and flame-retardant thermoplastic shell.

B. The connector shall be rated for the number and size conductors being connected.

C. The Wire Nuts shall be rated for 105^{o}C. And UL 486C listed.

D. Wire nuts shall be equal to connectors by Ideal/Buchanan, 3M/Scotch, or T & B,

2.13. SPLIT BOLT CONNECTORS:

A. Split bolt connectors for splicing conductors shall be UL 486A listed, shall be tin plated copper, and shall have a hexagonal head and nut.

B. Split bolt connectors for conductors sized AWG #4 and larger shall have a serrated spacer bar between conductors.

C. Split bolt connectors for splicing conductors AWG #12 through #6 shall be equal to Ilsco Type SEL and Type SK for AWG #4 and larger conductors.

2.14. MULTI-TAP CONNECTORS:

A. Multi-tap connectors shall be insulated type

B. Multi-tap connectors shall be rated for the conductor sizes indicated on the drawings.

C. The connectors shall be provided for the number of conductors indicated, including any future taps shown, plus a minimum of one additional tap.

D. Multi-tap connectors shall be equal to Ilsco Type PCT or Type PED-CP.

2.15. WATERPROOF WIRE JOINTS:

A. Splices made below grade shall be made connectors, UL listed as waterproof, for below grade applications.

B. Waterproof Twist On Connectors for Up to2#6 W/1#12 tap Conductors: Single piece wire nut pre-filled with silicone sealant. Sealant shall be rated for 45-400 degrees F. Connectors shall have same insulation rating as conductors. Sizes shall be available for connecting up to 2 #6 w1#12 tap conductors. Connectors shall be UL listed as waterproof for below grade applications and equal to Ideal Buchannan B-Cap Twist and Seal Wire Connectors, King Safety Products, Tyco/Raychem GelCap SL, or equal.

C. Waterproof Stub Splice Kit for up to #2/0 Conductors: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for feeder wire sizes #14 through #2/0 and tap wire sizes of #14 through #6. Connectors shall be UL listed as waterproof for below grade applications and equal to Tyco/Raychem GelCap SL.

D. Waterproof In-line Splice Kit for up to #2/0 Conductors: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for wire sizes #6 through #350 kcm. Connectors shall be equal to Tyco/Raychem GTAP.

E. Waterproof Splice Kit for Conductors above #2/0: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for wire sizes #14 through #2/0. Connectors shall be equal to Tyco/Raychem GHFC.

2.16. PLASTIC MARKING TAPE FOR MARKING UNDERGROUND CABLES AND CONDUITS:

A. Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch.

B. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise.

C. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep.

D. The tape shall be of a type specifically manufactured for marking and locating underground utilities.

E. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.

F. Tape color shall be as specified in the table below and shall bear a continuous printed inscription describing the specific utility.

Red:	Electric
Orange:	Data, Telephone, Television,

2.17. FIRE STOPPING:

A. Fire sealant shall be intumescent caulk, putty, sheet and/or wrap/strip as required to attain the proper rating.

B. Caulk shall be equal to 3M CP25 N/S and/or S/L.

C. Putty shall be equal to 3M Fire Barrier Moldable Putty.

D. Sheet equal to 3M CS195.

E. Wrap/strip equal to 3M FS195.

F. Equal products by Dow Corning, Hilti, and Metacaulk will be accepted.

2.18. SPACERS FOR CONCRETE ENCASED ELECTRICAL DUCTS:

A. Spacers shall be interlocking high impact plastic assemblies, which provide horizontal and vertical spacing, and hold the ducts and re-bar, where applicable, in place.

B. The spacers shall be equal to Carlon Snap-Lok Spacers.

2.19. JUNCTION BOXES (THRU 4-11/16"):

A. Sheet Metal: To be standard type with knockouts made of hot dipped galvanized steel, By Steel City, Raco, Appleton or approved equal.

B. Cast: To be type FS, FD, JB, GS or SEH as required for application.

2.20. JUNCTION AND PULL BOXES (LARGER THAN 4-11/16"):

A. Shall be cast metal for all below grade exterior use and where indicated on plans. All other shall be oil tight, JIC boxes not less than 16 gauge, equal to Hoffman type "CH" boxes.

2.21. PULL BOXES:

A. Galvanized sheet metal screw-cover type with UL label as produced by Austin, B & C Metal Stamping Company, E-Box, Hoffman, Wiegmann, or approved equal.

2.22. JUNCTION AND TERMINAL BOXES FOR AUXILIARY SYSTEMS:

A. Junction boxes for auxiliary system circuiting splicing shall be formed of galvanized steel.

B. Boxes shall have hinged front, locking door(s).

C. Metal back plates shall be provided for mounting terminal strips or other devices.

D. Screw terminal strips shall be provided with a minimum of 25 percent spare terminals.

E. Boxes shall be sized to accommodate the terminal blocks and conductors, providing code required bending space.

F. Boxes for auxiliary systems shall be manufactured by Austin, E-Box, Hoffman, or Wiegmann.

G. Provide complete back boxes for all surface mounted devices. Back box shall have knockout on top and bottom as needed. Surface mounted junction boxes with devices mounted to it will not be accepted. Wiremold boxes will be accepted.

2.23. AUXILIARY GUTTERS (WIRING TROUGHS):

A. Gutters shall be of sizes shown and/or required by the NEC (whichever is larger), constructed of code gauge, galvanized sheet steel, painted ANSI 61 gray.

B. Gutters shall be UL listed and shall be of NEMA 3R construction in wet or damp locations or shall be as indicated on the drawings.

C. Gutters shall be as produced by Austin, B & C Metal Stamping Company, E-Box, Hoffman, Wiegmann, or approved equal.

2.24. STRUT SYSTEM FOR SUPPORT OF ELECTRICAL EQUIPMENT:

A. Strut shall be 1-5/8” except where heavier strut is required to support the load, for rigidity, or where specifically indicated otherwise.

B. Cold-formed steel, ASTM A 570 or A 446 GR A.

C. Stainless Steel Strut: Type 304, ASTM A 240.

D. Hot Dipped Galvanized Steel Strut: Zinc coated after manufacturing operations are complete, ASTM A 123 or A 153

E. Electro-galvanized Steel Strut: Electrolytically zinc coated, ASTM B 633 Type III SC 1.

F. Fittings: Same material as strut, ASTM A 575, A 576, A 36, A 635, or A 240.

G. Zinc Primer: As recommended by strut manufacturer.

H. Strut Systems shall be as manufactured by B-Line, Erico, Globe, Kindorf, MasterStrut, Power Strut, T&B SuperStrut, or Unistrut.

2.25. OUTLET BOXES:

A. General: Except as noted, boxes shall be standard hot dipped galvanized steel at least 1-1/2" deep, of metal at least 1/16" thick; sized to accommodate devices and conductors per NEC Article 370; product of Appleton, National, Steel City, or approved equal.

B. Ceiling and Wall Bracket Outlets: 4" octagonal boxes with plaster rings appropriate for finish surface.

C. Typical boxes (for switches, receptacles and auxiliary systems):
   1. All junction boxes shall be recessed within the confines of the walls unless otherwise noted. Junction boxes shall be accessible by means of a coverplate or a standard junction box cover whichever is appropriate for the installation.
   2. 4" square boxes ganged as required. Box volume shall be in accordance with NEC Section 370 – provide extensions as required.
   3. Furnish with 3/4" plaster rings where employed in plaster, 1" tile covers where used in ceramic tile, 1" plaster rings where set in exposed concrete, and otherwise appropriate for surface and construction.
   4. Use 4-11/16” square, 2-1/8” deep boxes where more than 10 conductors enter the boxes. Provide extensions as required to provide volume per NEC.
   5. Where existing walls are furred out with shallow hatch channel and sheet rock then the contractor will be required to use a shallow junction as required.
   6. All exposed junction boxes for receptacles, communications devices, switches, and fire alarm devices shall be provided with back boxes. Do not use standard stamped steel junction boxes when exposed. No exposed edges of devices plates will be allowed. No knockouts on the side of the box. Boxes shall be similar to Wiremold 500 & 700 Series or FS boxes. The wall plates will not be allowed to have overlap plates.

D. Boxes in Exposed (or Thin-Coat Plastered) Masonry: Where conduit connections permit, employ solid flush-type, square-cornered, masonry boxes with turned-in device holders; otherwise employ typical box with 1-1/2" square-cut tile cover.

E. Boxes used with Exposed Conduit: 4" square utility boxes.

F. Exterior Boxes: Galvanized cast-metal boxes, Crouse-Hinds Type FS or FD as appropriate. Make weatherproof with gasketed covers. Equal products by Appleton, Killark, O-Z/Gedney or approved equal will be accepted.

G. Exterior Boxes: All receptacle boxes shall be recessed unless specifically called out not to be. This includes exterior receptacles in all masonry type walls including but not limited to Pre-cast, Brick, Block, etc.

H. Boxes used with Recessed Lighting Fixtures: Provide a 4" square box with blank cover.

I. Boxes in Dry Wall Construction: Sectional type switch boxes at least 2-1/2" deep may be used instead of typical box (but not where dry wall finish is applied over masonry back-up and not where multi- gang devices occur).

J. Boxes installed exposed in kitchen and dishwashing areas shall be copper free cast aluminum with gasketed cast coverplates, without lift cover, unless specifically indicated otherwise on the drawings.

K. All junction boxes shall be mounted in accessible locations. Provide access panels as needed in hard or detention surfaces to access.

2.26. CONDUCTORS AND CABLES:

A. Power Conductors
   1. The ungrounded conductors (phase) and the grounded conductor (neutral) of each voltage system being installed shall be phase identified the full length of the conductor with the color characteristics manufactured in the insulation of cable from the cable manufacturer. Required color cable will then be installed for the specific voltage system as identified in these specifications.
   2. All conductors shall be copper with not less than 98% conductivity and with current carrying capacities per N.E.C. for 60^{o}C. for sizes through #1 AWG and 75^{o}C for conductors #1/0 and above.

3. All conductors shall have manufacturer's name, type insulation, and conductor size imprinted on jacket at regular intervals.
4. Conductors of size #10 and smaller shall be solid copper conductors with 600-volt type THHN or THWN insulation.
5. Conductors of size #8 and larger shall be stranded copper conductors with 600-volt type THHN or THWN insulation.
6. All motor branch circuits, HVAC, and plumbing equipment shall be stranded copper conductors with 600-volt type RHH-RHW insulation.
7. All conductors installed in conduit below grade shall be rated for wet location.
8. Manufacturer: Conductors shall be products of GE, Triangle, Phelps- Dodge, Anaconda, Rome, Habirshaw, General Cable, or approved equal.
9. Fixture Wire:
    a. Conductors feeding into fixtures, other than fluorescent fixtures, of 300 watts or less shall be #14, 200^{o}C., type SF-2, for fixtures of more than 300 watts #12, 200 ^{o}C., type SF-2 shall be used.
    b. Conductors pulled through fluorescent fixtures shall have Type TFN or TFFN fixture wire, rated 90oC.
    c. Conductors shall be by Dodge, Anaconda, Rome General Cable or Southwire.

B. Control and Signal Wire: Conductor type TFF, minimum size #16 copper and fully color-coded, shall be used. Conductors shall be by Anaconda, Houston Wire & Cable, General Cable, Phelps Dodge, Rome, or Southwire.

2.27. WIRING DEVICES:

A. General: Manufacturer's and catalog numbers listed are used to establish style, type and quality. Unless otherwise indicated on drawings, all wiring devices shall be UL listed, side-wired specification grade.

B. Manufacturers: Equal devices by Hubbell, Leviton, Eaton and P & S will be accepted. All devices shall have plaster ears.

C. Wall switches: 120/277V, 20A, AC, flush enclosed, quiet type switches with thermoplastic body and polycarbonate toggles. Switches shall meet Federal Specification WS-896. Switches shall be, Hubbell 1200 series, Leviton 1200 series, Eaton AH1200 series or P & S PS20AC series single pole, 2-pole, 3-way, or 4-way as required.

D. Duplex receptacles (general purpose): 125V/20A flush duplex back and side wired hard use specification grade receptacles, NEMA 5-20R configuration, with nylon face and body, grounding terminal and break-off fins for converting to 2-circuit use. Receptacles shall meet Federal Specification WC-596. Color to match wall switches. Equal to P & S 5362, Hubbell CR20, Eaton 5362 or Leviton 5362.

E. Tamper Resistant Duplex receptacles, 125V/20A flush duplex, hospital grade, tamper resistant receptacles, NEMA 5-20R configuration, with nylon face and body, grounding terminal. Receptacles shall meet Federal Specification WC-596. Color to match wall switches. Equal to P & S TR62-H, Eaton TR8300 or Hubbell HBL8300SGDuplex combination 125/250-volt receptacles: receptacles shall be 20 amp, combination 125 volt (NEMA 5-20R)/250-volt (NEMA 6-20R) grounding receptacles.

F. Ground Fault Circuit Interrupt Receptacles: 125V/20-amp ground fault circuit interrupting receptacle for personnel protection, NEMA 5-20R configuration, Equal to Hubbell #GF5362, Leviton #6599, Eaton SGF20 or P & S 2091. Each GFCI symbol on drawing indicates a GFCI type receptacle. Do not through-wire non-GFCI receptacles from GFCI receptacles where ground fault protection is required. All exterior receptacles shall be ground fault interrupting type with weatherproof coverplates.

G. Faceless Ground Fault Circuit Interrupter: 125V, 20-amp ground fault circuit interrupter UL listed for personnel protection, equal to Hubbell GFR5350 Series, Leviton 6490, Eaton SGFD20 or Pass & Seymour Series 2081.

H. Single Receptacles: Flush Bakelite receptacles with side wiring and grounding terminal, voltage, amperage, and configuration as required for circuit indicated.

I. Each single or multi outlet receptacle, other than straight blade, 15 or 20 amp, 120 volts, NEMA 5-15R or NEMA 5-20R, shall be provided with matching cord plugs.

J. Plugs for kitchen equipment to be plugged into wall mounted straight blade receptacles shall be angled type.

K. Wiring devices shall be of color as directed by Architect. Devices must be available in ivory, brown, black, white, and gray. Devices connected to the emergency generator shall be red in color.

L. All receptacles shall be tamper-proof type receptacles where required by the National Electrical Code.

2.28. DEVICE PLATES:

A. Type appropriate for the associated wiring device, equal to Sierra Stainless Steel Smoothline. Device plates shall be of color as directed by Architect. Devices must be available in ivory, brown, black, white, and stainless steel. Provide single plate of proper gang where more than one device occurs (do not gang dimmers with rocker switches).

B. Damp Location: 20 amp,125 and 250-volt receptacles - Covers shall be weatherproof when plugs are not installed, provide cast aluminum weatherproof coverplates with single lift cover and gasket equal to Hubbell CWP26H.

C. Wet Locations, 20 amp, 125 and 250-volt receptacles: Covers shall be weatherproof In-Use covers, rated NEMA 3R when in use and shall be constructed of cast aluminum with sealing gasket. Covers shall be equal to products by Hubbell, Leviton, Steel City, T & B, and Taymac.

D. Coverplates for exposed cast aluminum boxes in kitchen and dishwashing areas shall be cast coverplates, without lift cover, unless specifically indicated otherwise on the drawings.

E. Color: Wiring device cover plates shall be of color as indicated on drawings or directed by Architect. Devices must be available in ivory, brown, black, white, gray, and stainless steel.

F. Jumbo and Mini-Jumbo plates will not be accepted.

2.29. OCCUPANCY SENSORS AND ACCESSORIES FOR LIGHTING CONTROL:

A. Occupancy sensors shall be totally passive in nature, in that the sensors shall not emit of interfere with any other electronic device, or human characteristic. Sensors shall be dual technology, i.e.: Passive Infrared (PIR) and Microphonic.

B. PIR shall initiate an “on” condition and the PIR or microphones shall maintain the load “on”.

C. Upon detection of human activity by the detector the lights shall come on and a time delay shall be initiated to maintain the lights on for a pre-set time period. The time delay shall be factory set and field adjustable from 30 seconds to 20 minutes.

D. All devices shall be factory warranted for 5 years.

E. All sensors shall be low voltage, 12 to 24 volts and shall work in conjunction with remote power packs.

F. Occupancy sensors shall be as shown on drawings.

2.30. GROUNDING:

A. Ground Rods shall be ¾” x 10’ copperclad steel.

B. All grounding conductors shall be copper.

2.31. LIGHTING FIXTURES

A. General:
   1. All Lighting Fixtures shall be UL labeled.
   2. Fixtures installed in fire rated ceilings or ceiling assemblies shall be rated for installation in fire rated ceilings.
   3. Furnish fixtures complete with lamps, ballasts and internal wiring factory installed.
   4. Fixtures shall be furnished as specified herein and as shown on the fixture schedule on the plans. Catalog numbers shown are for basic units; furnish all fixtures complete with flexible connections, trim, plaster frames, and all other appurtenances necessary to the installation.
   5. Substitutions: Reference to a specific manufacturer's product is made to establish a standard of quality and design, and to give a general description of the basic type desired. Equal products by the listed manufacturers will be accepted subject to the Engineer's approval.
   6. It shall be the responsibility of the contractor to verify the exact type ceiling, type fixture mounting and trim, and recessing depth of all recessed fixtures prior to purchasing any fixtures.
   7. Stems on stem mounted fixtures shall be approved ball aligner type, swivel 30 degrees from vertical with swivel below canopy. Paint stems the same color as the fixture trim. Stems in unfinished areas may be unpainted conduit.
   8. High and low bay fixtures shall be equipped with safety chains. Every suspended fixture in Gymnasium shall have safety chains.
   9. Fixtures installed on the exterior of buildings, on poles, or on pedestals shall be rated for wet location installation.
   10. All lighting fixtures installed in gymnasiums, hangars or similar use areas shall be provided with wire guard.

B. Emergency and Exit lighting Fixtures shall be equipped with a Self-testing module which shall perform the following functions:
   1. Continuous monitoring of charger operation and battery voltage with visual indication of normal operation and of malfunction.
   2. Monthly discharge cycling of battery with monitoring of transfer circuit function, battery capacity and emergency lamp operation with visual indication of malfunction. The battery capacity test may be conducted by using a synthetic load.
   3. Manual test switch to simulate a discharge test cycle.
   4. Modules shall have low voltage battery disconnect (LVD) and brownout protection circuit.
   5. All lighting fixtures and exit signs shown as emergency on drawings shall be provided with a minimum 1100 lumen emergency battery ballast capable of 90 minutes of illumination. No exceptions.

C. Lamps: Type and Lumen Output as scheduled.
   1. LED bulb shape shall comply with ANSI C79.1. Lamp base shall comply with ANSI C81.61.
   2. Minimum CRI of LED lamps shall be 80 with a color temperature as shown on drawings.
   3. Rated life of all LED lamping shall me a minimum of 50,000 hours failure to 75% of lamp output.
   4. LED lamping shall be capable of dimming from 100% to 0%.

2.32. PANELBOARDS:

A. General: All panelboards shall be dead front type manufactured and installed in accordance with UL and NEMA standards and shall carry a UL label. Ampacity, service voltage, and configuration shall be as indicated on drawings. Panelboards shall be clearly marked with ampacity, voltage, and maximum short current ratings.

B. Manufacturer: Panelboards shall be as manufactured by Cutler-Hammer, Square D, or Siemens.

C. Enclosure:
   1. Panelboard enclosures shall be as indicated on drawings.
   2. Unless otherwise indicated, all boxes shall be constructed of galvanized (or equivalent rust-resistant) sheet steel with hinged front trim.
   3. Fronts shall be door in door with two lockable latches to open door, lock, and latch. All panelboard locks shall be keyed alike. Piano hinges with screw latches will not be permitted.
   4. Fronts shall be finished with gray baked enamel over a rust-inhibiting phosphatized coating.
   5. All dual section panels shall be equal in size. Sub-Feed circuit breakers will not be allowed to feed second section.
   6. Sub-Feed circuit breakers feeding additional panels or equipment shall be branch mounted.
   7. Provide permanent numbering of the panelboards. Stickers are not considered permanent.
   8. Any panelboard schedule that indicates more than 42 circuits shall be provided in two equally sized panelboards.
   9. Main circuit breakers shall be centered mounted. Main breaker cannot be mounted on buss bars with other circuit breakers.

D. Buss Assembly:
   1. Bussing shall be copper.
   2. The buss assembly A.I.C. shall be rated as indicated on drawings. Ratings shall be established by heat rise tests, in accordance with UL Standard 67.
   3. All bussing shall accept bolt on circuit breakers.
   4. Current carrying parts of all bussing shall be plated. In lighting and receptacle panels, bussing shall be designed for connection to the branch circuit breakers in the phase sequence format. Distribution panelboards shall be fully bussed.
   5. Ground bars shall be provided in all panelboards.
   6. Neutral bar shall be fully sized with lugs suitable for incoming and outgoing conductors.
   7. Provide insulated ground buss where indicated on the panelboard schedules.

E. Circuit Breakers:
   1. Circuit breakers shall be quick-make, quick-break, thermal magnetic, molded case, bolt on type.
   2. Circuit Breakers shall be numbered and arranged as indicated on the panelboard schedules and/or single line wiring diagrams. Numbers shall be permanently attached to trim.
   3. SWD Circuit Breakers: Single pole circuit breakers rated 15 and 20 amperes and intended to switch 277 volts or less fluorescent lighting loads shall be UL rated for switching duty and shall be marked "SWD”.
   4. HACR Circuit Breakers: Circuit breakers 60 amperes or below, 240 volts, 1-, 2-, or 3-pole, intended to protect multi-motor and combination-load installations involved in heating, air conditioning, and refrigerating equipment shall be UL listed as HACR type and shall be marked "Listed HACR Type."
   5. Circuit breakers serving fire alarm systems, dedicated emergency/exit lighting circuits, and area of rescue communications systems shall be equipped with a screw-on, mechanical handle blocking device which locks the circuit breaker in the “ON” position.
   6. Circuit breakers serving circuits in residential bedrooms shall be Arc Fault Interrupting(AFI) type circuit breakers and shall be UL 1699 listed.

F. Directories:
   1. Each panelboard shall be equipped with a metal directory frame with a clear cover welded to the inside of the door.

G. Equipment Short Circuit Rating: Short Circuit Interrupting Ratings shall be as indicated on the plans and schedules. Unless specifically indicated otherwise all rating are “Fully Rated”

capacities. Where no rating is given, the contractor shall verify the available short current with the serving utility and provide equipment rated accordingly.

H. Lighting panelboard cans shall be a maximum of 20" wide and 5 ¾" deep. Cans of multi-section panelboards shall be the same size.

I. Provide nameplate as called out on drawings.

J. All circuit breakers 1200-amp and up shall comply with NEC Article 240.87 Arc Energy Reduction.

K. All flush mounted panel shall be provided with six (6) ¾" conduit stubbed up above accessible ceiling.

L. Any circuit breaker serving an elevator shall be shunt trip type with auxiliary contacts.

2.33. DISTRIBUTION PANELBOARDS:

A. Furnish and install distribution and power panelboards as indicated in the panelboard schedule(s) or single line wiring diagrams and where shown on the plans.

B. Panelboards shall be dead front, safety type equipped with thermal magnetic, molded case circuit breakers with trip ratings as indicated on the schedule(s).

C. Panelboard bussing shall be copper.

D. Panelboard buss structure and main lugs or main breaker(s) shall have the fault current ratings as indicated on the drawings. Ratings shall be established by heat rise tests conducted according to UL Standard UL67.

E. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. The front faces of all circuit breakers shall be flush with each other.

F. Main circuit breakers shall be centered mounted. Main breaker cannot be mounted on buss bars with other circuit breakers.

G. An engraved phenolic label shall be permanently attached to the front of the panelboard adjacent to each circuit breaker identifying the load served by the circuit breaker.

H. Automatic tripping shall be clearly shown by the breaker handle taking a position between ON and OFF when the breaker is automatically tripped.

I. Provisions for additional breakers shall be such that no additional connectors or hardware will be required to add breakers.

J. The panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel shall be as specified in UL Standards. End walls shall be removable. The size of wiring gutters shall be in accordance with the National Electrical Code, NEMA, and UL Standards for panelboards.

K. Cabinets shall be equipped with four-piece fronts.

L. The panelboard interior assembly shall be dead front with panelboard front removed.

M. Main lugs or main breaker shall be barriered on live sides.

N. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the buss structure opposite the mains shall be barriered.

O. Circuit breakers serving Fire Alarm Systems, Security Systems, and/or Emergency/Exit lights shall be equipped with mechanical, screw-on type, locking devices. These devices shall not be padlock type devices.

P. Panelboards shall be listed by Underwriters' Laboratories and to bear UL label. Panelboards shall be rated for use as Service Entrance Equipment where required by the National Electrical Code. Panelboards shall be by Cutler-Hammer, Square D, or Siemens.

Q. Provide nameplate as called out on drawings.

R. Any circuit breaker serving an elevator shall be shunt trip type with auxiliary contacts.

S. All circuit breakers 1200-amp and up shall comply with NEC Article 240.87 Arc Energy Reduction.

T. All flush mounted panel shall be provided with six (6) ¾" conduit stubbed up above accessible ceiling.

U. All service entrance main circuit breakers shall be 100% rated.

2.34. SAFETY SWITCHES:

A. Furnish and install safety switches as indicated on the drawings.

B. Switches installed on 277/480 volts systems shall be rated for 600 volts and those installed on 120/208 volt or 120/240-volt systems shall be rated for 240 volts.

C. Switches shall be NEMA Heavy Duty Type HD and Underwriters' Laboratory listed. Safety switches shall be Cutler Hammer, Siemens, or Square D.

D. General Duty disconnects will not be accepted.

E. Enclosures for switches mounted outdoors shall be NEMA 3R or as indicated on the plans.

F. Enclosures for switches installed in kitchen and dishwashing areas shall be NEMA 4X stainless steel or as indicated on the plans.

G. All safety switches for equipment with remote controls shall be equipped with a control circuit disconnect interlock.

H. Switches shall be lockable in the "ON" and in the "OFF" positions.

I. Provide each disconnect with a nameplate that indicates equipment name, voltage/phase, and feed from location.

J. Provide keyed brass locks on all disconnects that is located on the exterior of the building or in any area that is accessible to children or the public. All the brass locks shall be keyed the same and turn over 10 sets of keys to the owner at substantial completion.

K. Disconnect locations shown on drawings is diagrammatically shown. Disconnects shall be coordinated with other trades and placed in the optimal locations to serve equipment and shall be installed in the least obtrusive location. Disconnects will have to be moved at the cost of the contractor when there is conflicts with NEC clearances, access to space, or servicing of equipment. Architect/Engineer will have final judgment of proper location.

L. Disconnects serving an elevator shall be NEMA 3R and provided with auxiliary contacts.

2.35. MANUAL MOTOR STARTERS (TUMBLER SWITCH TYPE WITH OVERLOAD PROTECTION):

A. Starting and thermal overload protection for single phase motors 1/8 Hp to 1 HP shall be provided by manual motor starters with overload units rated as required by the specific motor to be served.

B. Switches installed for site disconnect switches shall be equipped with padlocking provisions.

C. Starters shall be by Cutler Hammer, General Electric, or Siemens with NEMA Type 1 enclosure or NEMA Type 3R enclosure where installed outdoors.

2.36. TRANSIENT VOLTAGE SURGE PROTECTORS (SURGE PROTECTIVE DEVICES):

A. Provide transient voltage surge protectors (Surge Protective Devices) where indicated on the plans. At a minimum provide on all service entrance panelboards/switchboards and any panelboard/switchboards on the secondary side of a dry-type transformer.

B. Service Entrance Panelboards and at Subpanel Protectors shall be listed and labeled and components recognized in accordance with UL 1283 and UL 1449 Second Edition, including highest fault current of Section 37.3.

C. All devices shall meet or exceed the following:
   1. NEMA LS 1-1992.

2. Minimum surge current capability, single pulse rated, per mode:
   a. Service Entrance – 100 kA (200 kA per phase)
   a. Distribution and branch panelboards – 80 kA (160 kA per phase)
3. UL 1449, Second Edition, Listed and Labeled, and Recognized Component Suppressed Voltage Ratings shall not exceed (1.2x50□s, 6kV open circuit and 8x20□s, 500A short circuit test wave forms at end of 6" lead):

Voltage	L-N	L-G	N-G	L-L
208Y/120v	400	400	330	700
480Y/277V	800	800	800	1500

4. Testing shall be done at the end of 6" leads with the complete unit including any fuses and all other components making up the unit.

D. The devices shall have a minimum EMI/RFI filtering of –50dB at 100kHz with an insertion ratio of 50:1 using MIL-STD-220A methodology.

E. Devices shall utilize MOV's of 25 mm diameter or larger, shall have pilot lights visible on the outside of the enclosure to indicate device operating condition, and shall provide contacts for remote monitoring of device condition.

F. Devices shall be modular in design with individual module fusing and thermal protection.

G. Devices shall incorporate visual alarm signals that indicate the failure of a single MOV and total loss of protection.

H. Wye connected devices shall provide L-L, L-N, L-G, and N-G surge diversion with L-N/L-G bonded at service entrance devices. Delta connected devices shall provide L-L and L-G protection.

I. Data Line Surge Protectors: Data Line Surge Protectors shall be UL 497B listed and labeled. The units shall be heavy duty devices utilizing a combination of silicone diodes and gas tube technology to provide surge protection.

J. All devices shall have a minimum warranty period of five years, incorporating unlimited replacement of suppressor parts if they fail during the warranty period.

K. Transient voltage surge suppressors shall be manufactured by AC Data Systems, Advanced Protection Technologies, Current Technologies, Cutler-Hammer, General Electric, Joslyn, Liebert, or MCG.

2.37. SECONDARY SURGE ARRESTERS:

A. Secondary surge arresters shall be UL listed under UL Classification (Lightning Protection) Surge Arresters (OWHX).

B. Surge arresters shall be rated at same voltage and phase configuration as service.

C. Arresters shall be equal to Cooper Power Systems ASZH Series, Cutler-Hammer, GE Tranquell, Joslyn Electronic Systems, Leviton models as required to match the voltage of the system served.

2.38. FUSES:

A. General: Fuses shall be UL listed time delay types with a minimum interrupting rating of 100,000 amps symmetrical.

B. 200 amps and below: Provide Class RK-5 current limiting, time delay, rejection type as manufactured by Busman Manufacturing, Ferraz Shawmut, or Littlefuse.

C. 201 to 600 amps: Class RK-1, current limiting, time delay, rejection type as manufactured by Bussman, Ferraz Shawmut, or Littlefuse.

D. Above 600 amps: Class L current limiting, time delay, as manufactured by Busman Manufacturing, Ferraz Shawmut, or Littlefuse.

2.39. DRY TYPE TRANSFORMERS:

A. Manufacturer: Transformers shall be as manufactured by Cutler-Hammer, GE, Square D, or Siemens.

B. General: Transformers shall be constructed in conformance with IEEE, NEMA and ANSI standards.

C. Transformers shall be dry type with copper windings, rated as scheduled on drawings.

D. Transformers rated at 15 KVA and below shall be Class 185 (115 degree Celsius rise); transformers rated above 15 KVA and above shall be Class 200 (150 degree Celsius rise).

E. Transformers shall have ventilated code gauge steel enclosure. Enclosures shall be for indoor installation unless indicated otherwise

F. Units shall be equipped with four (4) 2-1/2% full capacity taps, two above and two below rated primary voltage.

G. Core and coils shall be mounted on vibration pads and sound level of enclosed units shall be in conformance with NEMA standards.

2.40. LABELING:

A. Provide laminated plastic nameplates for each panelboard, equipment enclosure, relay, switch, and device.

B. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic 0.125-inch thick, white with black center core.

C. Provide red laminated plastic label with white center core where indicated.

D. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core.

E. Minimum size of nameplates shall beone by 2.5 inches.

F. Lettering shall be a minimum of 0.25-inch high normal block style.

G. See Panelboard details for proper labeling of all panelboards.

2.41. PHOTOCELLS, TIME SWITCHES AND CONTACTORS:

A. Photocells: Units shall have 1" diameter, hermetically sealed, cadmium sulfide sensing cell with 3-prong NEMA locking plug, rated for wet locations. Units shall have built-in time delay. Units shall be equal to Tork 5231 of correct voltage to match load or use with matching receptacle equal to Tork 2421.

B. Time switches:

1. Unless otherwise indicated on drawings, time switches shall be 24-hour electromechanical type having synchronous motor drive with two single pole double throw contacts rated 20 amps minimum.
2. Unit shall have spring back up, with automatic rewind, capable of providing 16 hours minimum of reserve power upon electric power failure.
3. Units shall be furnished in an enclosure, NEMA 1 indoor and NEMA 3 outdoors. Enclosures shall be flush mount unless otherwise indicated on drawings.
4. Units shall be Tork 7120L, or equal by Paragon or Sangamo.
5. Time switch(es) shall be digital, seven day format, two channel time switches with 9v lithium battery 30 day back-up and with metal indoor enclosure. The controllers shall be equal to Tork #DW200A-Y.

C. Contactors: Units shall be electrically held or electrically operated mechanically held, as indicated on drawings, and shall be recommended by manufacturer for type of load served.

D. Contacts shall double-break type of same ampere rating as line side circuit wiring.

E. Contacts shall be field-convertible to normally open or normally closed.

F. Contactor coils shall be encapsulated. Electrically held contactors shall have continuously rated coils. Mechanically held contactors shall be equipped with coil-clearing contacts to energize coils only when switching.

G. Units shall be furnished in an enclosure, NEMA 1 indoor and NEMA 3 outdoors.

H. Units shall be equal to GE CR460 series in NEMA 1 or NEMA 3R enclosure as indicated.

2.42. CONCRETE:

A. Concrete for electrical requirements shall be:

1. Composed of fine aggregate (sand), coarse aggregate (graded from three-sixteenth (3/16) inch to one (1) inch), Portland cement, and water proportioned and mixed so as to produce a plastic, workable mixture.
2. Aggregates shall be free from detrimental amounts of dirt, vegetable matter, soft fragments, or other foreign substances.
3. Water shall be fresh, clean, and free from salts, alkali, organic matter, and other impurities.
4. Concrete shall have a minimum 3000 psi ultimate twenty-eight day compressive strength and a maximum three (3) inch slump.

PART 3 - EXECUTION

3.01. GENERAL:

A. This section includes the installation of the complete electrical system.

3.02. ELECTRICAL SYSTEM DEMOLITION:

A. Before any new work begins the Contractor shall determine and document in writing to the satisfaction of the Engineer the condition of existing electrical work and auxiliary systems that are to remain in service. After the new work begins any existing electrical work or systems that are found to be inoperative or defective and not so documented shall be repaired or replaced by the Contractor at no additional cost to the Owner.

B. Existing electrical equipment and materials to be reused shall be tested and repaired as required and installed for first class operation.

C. General: The manner-in-which the remaining portions of the electrical system are terminated, supported and generally maintained for permanent use shall comply with all applicable regulations of the National Electrical Code, applicable NFPA codes and any local codes.

D. Refer carefully to construction drawings prior to commencing with demolition to determine the intent of demolition. Contact the Engineer if there appears to be any conflict between the demolition and construction drawings.

E. See "Renovation" Section regarding modification and relocation of circuits.

F. Phasing: Phasing shall be as coordinated by the General Contractor.

G. Work in Occupied Areas: Coordinate work carefully with General Contractor to provide minimum disruption to occupied portions of project. Provide minimum of 24 hours advance notice to Owner of demolition activities that will affect Owner's normal operation.

H. Protections: Take necessary measures as required for protection of the Owner's personnel and the general-public, as well as Owner's property. Provide temporary barricades, partitions, bracing, and weather protection as needed. Remove all temporary protections at completion of work.

I. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. Maintain portable fire suppression equipment during flame-cutting operations.

J. System Protection: Protect and maintain all portions of existing system not indicated for demolition, including but not limited to light fixtures, panelboards and circuits.

K. Fire Protection: Coordinate with general contractor to ensure that all penetrations of fire-rated decks and partitions are properly sealed.

L. Removal of Circuits: All circuits indicated for removal shall be entirely removed, including raceway, back to take-off point or as far as possible without chasing (unless chasing is indicated). Where it is not possible to remove conduit, all conductors shall be removed and the conduit shall be permanently capped. Floor outlets indicated for removal shall be entirely removed, including outlet box, and capped below floor level (minimum 4" below floor level if in slab).

M. Where floor slab is damaged in the course of demolition, it shall be permanently repaired as soon as practicable.

N. Leave existing branch circuits and feeders which run through reworked areas and serve existing equipment to remain in service, continuous and uninterrupted.

O. Where service interruptions are required, obtain approval for interruptions in writing from Architect 14 days prior to interruption. Submit schedule of work to be performed and the time required to accomplish work with request for interruption.

P. Disposition of Material: Where electrical equipment is indicated for removal and not indicated for re-use, the owner shall have the option of taking possession of the equipment, the Contractor shall deliver any such material to a local site designated by the owner. The Contractor shall be responsible for disposing of all other materials in accordance with applicable codes and laws.

3.03. ELECTRICAL SYSTEM RENOVATION:

A. General: Provide renovations as indicated on drawings and specified herein as required for a complete, operational system, even though every item is not indicated.
   1. This Section is intended to serve as a supplement to the applicable sections within this Division, and in no way relieves the contractor from the requirements of any other Section.
   2. All renovations shall comply with all applicable regulations of the National Electric Code, applicable NFPA codes and any local codes

B. Materials and workmanship: Execute all work presenting a neat and workmanlike appearance when completed. Except where otherwise indicated, all materials shall be new, UL approved where a standard has been established. Where specific means and methods for affecting renovations are not covered in drawings and specifications, the contractor shall exercise prudent judgment in following accepted practices.

C. Modifications: All major deviations from the drawings and specifications shall be approved in writing by the Engineer.

D. Inspection:
   1. Inspect all existing electrical system components which are accessible, including fixtures, wiring devices, raceway and panelboards.
   2. Perform minor repairs to loose or damaged connections, damaged or missing supports, replacement of broken devices, replacement of missing plates and junction box covers and other visible damage or disrepair.
   3. Report major damage to Engineer.

E. Renovation Services: In addition to the scope of work indicated on the drawings and specified herein, it shall be the responsibility of this Division to provide minor modification and repair services made necessary to electrical system components through the normal course of renovation. Such services shall include but not be limited to minor repair or relocation of branch circuits necessitated by the work of other trades, as coordinated by the General Contractor.

F. Penetrations: Coordinate penetrations of existing walls, decks, and roofs required for electrical system with General Contractor. Do not cut structural members without the prior consent of Structural Engineer.

G. Raceway.
    a. Unless specifically indicated otherwise, existing raceway may not be used.
    b. Where existing raceway is indicated for possible re-use, it shall be the responsibility of this Division to verify that the condition and configuration of the raceway is in compliance with the NEC.

H. Panelboards: Where new circuits are run to an existing panelboard, thoroughly inspect the panelboard for any indications of arcing, overheating, or other damage. Report damage to the Engineer. Unless specifically allowed, tandem circuit breakers shall not be utilized.

I. Clearing of Neutral Faults: Any and all neutral faults to ground on existing system shall be corrected.

J. Service Ground: Visually inspect existing service ground electrode system for damage and code compliance. Check continuity from panel to each electrode with a meter. Make repairs as required.

K. Lighting Fixtures: Where existing lighting fixtures are indicated for re-use, they shall be thoroughly cleaned and re-lamped, no exceptions. Where existing lighting fixtures are indicated for replacement, it shall be the responsibility of this Division to verify the compatibility of new fixtures with existing ceiling type, existing penetrations, available support, and other existing conditions prior to submittal of fixtures. Any variances or required modifications shall be clearly indicated on the fixture submittal.

L. Backfilling, Grading, and Sodding:
    1. Restore surface features, including vegetation, at areas disturbed by Work of this Section.
    2. Reestablish original grades, unless otherwise indicated.
    3. If sod has been removed, replace it as soon as possible after backfilling is completed.
    4. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition.
    5. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces.
    6. Restore disturbed paving as indicated.

3.04. ELECTRICAL SERVICE:

A. General: Arrange with local electric Utility Company for service to be brought to the building, and for installation of meter. Provide all material and labor not supplied by Utility Company so as to produce a complete installation meeting the Utility regulations.

B. Service requirements: It is the responsibility of this Section, prior to bid, to reaffirm with the Utility Companies involved, that locations, arrangement, Power Company voltage, phase, metering required, and connections to utility service are in accordance with their regulations and requirements. If their requirements are at variance with these drawings and specifications, contract price shall include an additional cost necessary to meet those regulations without extra cost to Owner after bids are accepted.

C. Notify Architect of any changes required before proceeding with work.

D. Fees and deposits:
    1. The Electrical Contractor shall be responsible for verification and payment of all utility fees associated with installation of the electrical service.
    2. The Owner shall pay the cost of establishing an electrical service account and permanent meter deposit.

E. Metering: Obtain metering equipment from Utility Company and install in compliance with the Utility Company's requirements. The Electrical Contractor shall provide and install all necessary metering raceways, fittings, supports, connectors and ground conductor necessary for a complete installation. Provide 100# pull wire in all metering conduits.

F. Main Service Equipment: Provide UL approved service entrance components as indicated on drawings or specified herein.

G. Provide a full-size copy of the AS-BUILT Power Riser Diagram framed behind plexiglass screwed to the wall near service entrance in main electrical room.

H. Service lateral or feeder: Extend lateral or feeder of the size shown on drawings from service equipment to the point of service as indicated (verify exact location with Utility Company).
   1. For Overhead Service, provide and install service entrance fitting on conduit and leave sufficient slack conductor for connection to utility feeder 10' above finish grade, 12' above drive and 18' above street.
   2. For Underground Service, provide and install underground conduit to utility riser, as directed by Utility Company. Conduit shall be of size and quantity as indicated on drawings. Provide 480# polypropylene pull line in each empty conduit.
   3. For Underground Service, provide and install transformer pad, primary underground conduit to utility riser as directed by Utility Company, underground secondary conduit, and secondary conductors. Conduit shall be of size and quantity as indicated on drawings. Provide spare 4" conduit in transformer pad extending 2' beyond edge of pad with PVC cap. Provide 480# polypropylene pull line in each empty conduit.
   4. On service transformers with multiple taps, it shall be the responsibility of this section to coordinate tap selection with the electric utility to insure the proper nominal voltage.

3.05. GROUNDING:

A. Bond the neutral conductor and various conductive materials in the building per NEC Article 250.

B. Grounding Electrode System: A bare copper grounding conductor shall be bonded to grounding electrodes as specified below. This conductor shall serve as ground for system neutral and for building equipment bonding. Where conductor is #6, or smaller, or is subject to injury, it shall be run in conduit, Schedule 80 PVC or Rigid Galvanized to which the conductor shall be bonded at both ends.
   1. Grounding electrodes shall be as follows:
      a. Cold water piping, if metal and in direct contact with the earth for 10 feet or more, at the point of entry into the building. Attach ground conductor to cold water piping with UL approved bronze clamp.
      b. Building structural steel, if present and accessible.
      c. Grounding electrode shall be attached with exothermic weld connection or irreversible crimp type connector similar to Burndy YGHR connectors. Crimps must be made with Burndy tool approved by the manufacturer for setting irreversible crimp connections.
      d. Foundation reinforcing bar system. Coordinate with General Contractor to provide turned up re-bar (sleeved) near service point for attachment of grounding electrode above grade. Grounding electrode shall be attached with UL approved exothermic weld connector.
      e. Driven ground rod(s).
         1) Three 3/4" x 10' copper weld rods shall be driven into the ground at the lowest point adjacent to the building, spaced a minimum of 10' apart.
         2) Ground rods shall be driven to 12” below grade.
      f. Grounding electrode shall be attached with exothermic weld connection or irreversible crimp type connector similar to Burndy YGHR connectors. Crimps must be made with Burndy tool approved by the manufacturer for setting irreversible crimp connections.
      g. Existing grounding electrode system. If an existing electrical service is in place, it must be bonded to the new grounding electrode system.

C. Connections to grounding rods, building structure, counterpoise, and conductor junctions shall be made by exothermic weld unless specifically noted otherwise.

D. Electric system (neutral) ground: The current carrying neutral leg of the wiring system shall be of insulated conductor and shall be connected to the grounding electrode conductor only via the neutral connection at the service equipment. Each branch circuit or multi-outlet branch circuit shall be provided with a dedicated neutral conductor.

E. Equipment grounding conductors:
   1. An equipment grounding conductor (copper with green insulation except where bare copper is used) shall be provided in all wiring raceways.
   2. Sizes shall be in accordance with NEC 250.
   3. The equipment grounding conductor shall originate in the same panelboard, panelboard section, as the circuit conductors.
   4. The equipment grounding conductor bonding the sections of multi-section panelboards shall be sized per NEC 250.
   5. The equipment grounding conductor is not included in number of branch circuit conductors indicated on the drawings.

F. Computer backboard ground: provide a minimum #6 bare, solid copper grounding conductor from the electrical service grounding connection to the CBB. Leave six (6) feet minimum of free conductor. Install the conductor in PVC conduit where inside the building.

G. Grounding electrode resistance shall be less than 15 ohms. The resistance of the grounding electrode shall be tested by the Fall of Potential Method.

H. Each grounding conductors at the service entrance ground bus bar shall be provided with a brass round identifying tag. Tag shall indicate where ground wire is terminated.

3.06. EXCAVATION, CUTTING AND BACKFILLING:

A. Provide cutting and patching, under the supervision of the General Contractor, as required for the work in Section 16.

B. Locate all existing below grade and/or below floor utilities prior to beginning any site excavation or cutting of existing floor slabs. The Contractor shall repair any damage to existing utilities or systems.

C. Saw cut existing concrete slabs and asphalt paving.

D. Trenching:
   1. Dig trenches true to line, with a flat, even bottom.
   2. Width of the trench shall provide not less than 3 inches clearance from the conduit to each side of the trench.
   3. Ensure that foundation walls and footings and adjacent load bearing soils are not disturbed in any way.
   4. Conduits shall be installed below footings where possible. Where a line passes under a footing, make crossing with the smallest possible trench to accommodate the conduits/sleeves.
   5. Where a line must pass adjacent to and below the bottom of a column footing, or the corner of a continuous footing, backfill the trench with concrete up to the level of the footing bottom, for a distance away from the footing equal to the depth of the fill.
   6. Keep excavation free from water, by pumping if necessary.
   7. Where rock, soft spots, or sharp-edged materials are encountered, excavate the bottom for an additional 3 inches, fill and tamp level to proper elevation with sand or earth free from particles that would be retained on a ¼-inch sieve.
   8. Remove and relocate existing obstructions as directed.
   9. The Contractor shall be responsible for the repair and/or replacement of any damage to existing utilities, structure, or finishes.
   10. Coordinate work with other trades as work progresses so cutting and patching will be minimal.

11. Refer to Section “Earthwork” for shoring, sub-soil assumptions and data, work around trees, surplus earth, etc.

E. See Section 16100, “Conduit Installation, Below grade and below slab conduit installation”, for installation of conduits in trenches.

F. Backfilling:
   1. Immediately after inspection, cover conduits with 3” of compacted sand or earth free from particles that would be retained on a 1/4inch sieve. Do not to disturb the alignment or joints of the conduits.
   2. Carefully backfill with 4” of earth free from clods, brick, etc., firmly puddling and tamping.
   3. Thereafter, puddle and tamp every vertical 4” for hand tamping or 8” for heavy duty mechanical tamping.
   4. Backfill shall meet the compaction requirements set forth in Division 2.
   5. Backfilling Beneath Slabs and Pavement: Trenches beneath future slabs or pavement, including but not limited to buildings, drives, parking areas, sidewalks, playground surfaces, and equipment pads, shall be backfilled, from 3” above top of conduits to final grade, with crushed aggregate, AHD 825, type B, compacted in 4” layers to 100% ASTM 698.
   6. Install marking tape above conduits at 12 inches below grade.

3.07. SLEEVES, INSERTS, AND SUPPORTS:

A. Provide and install No. 16 gauge galvanized steel or iron sleeves in all walls, floors, ceilings, and partitions. Sleeves shall have no more than 1/2" clearance around pipes and insulation.

B. The contractor shall furnish to other responsible trades all sleeves, inserts, anchors and other required items which are to be built in by other trades for securing of all hangers or other supports by the Contractor.

C. The contractor shall assume all responsibility for the placing and sizing of all sleeves, inserts, etc., and shall either directly supervise or give explicit instructions to other trades for their installation.

D. The contractor shall seal all conduits through floors, smoke partitions, and floor partitions, with a sealant approved for the application.

E. All sleeves through sound barrier walls and partitions shall be sealed with mineral wool.

F. Through the floor conduit penetrations shall be sealed watertight.

G. Furnish and install steel angles and channels as required for mounting and bracing heavy equipment and conduits. Steel shall be securely bolted or welded to structure and equipment bolted to the steel framework. Obtain the approval of the Architect prior to welding.

3.08. BELOW GRADE THRU WALL WATER SEALS:

A. Each conduit penetrating exterior, below grade, cast cncrete walls shall have the annular space aroung the conduit sealed with an approved Thru Wall Water Seal System.

B. Where the system includes water seal thru wall sleeves, the Electrical shall provide properly sized sleeves to the contractor responsible for constructing the walls and shall be responsible for the proper location of each sleeve.

C. Where openings are to be core drilled, the Electrical Contractor shall be responsible for the core drilling and for coordinating proper sizing and location of each opening.

3.09. FIRE STOPPING:

A. The Electrical Contractor shall be responsible for firestopping of all penetrations of fire rated partitions made by any and all lighting, power, and auxiliary circuiting, sleeves and/or equipment.

B. The Electrical Contractor shall submit manufacturers' UL System drawings for the systems to be utilized. The systems shall be compatible with the partition ratings as indicated on the Architectural drawings and in accordance with details on the Electrical drawings.

C. Penetrations of fire rated partitions shall be sealed with an approved fire sealant resulting in the completed penetration having the same fire rating as the partition.

D. The installation shall be in accordance with the manufacturer's UL system detail and installation instructions to attain the required fire partition rating.

E. Empty sleeves through 1 and 2 hour rated partitions shall be plugged with mineral wool.

F. Sleeves through 4 hour rated partitions shall be plugged with mineral wool and fire stopping material.

3.10. ROOF PENETRATIONS:

A. Furnish roof flashing for all equipment, installed under Section 16, which penetrates through the roof. Flashing shall be approved by the Architect prior to installation.

3.11. CONDUIT INSTALLATION:

A. Conduits shall be as follows:
   1. Overhead Service Entrance - Rigid Galvanized Steel (RGS) Conduit or IMC.
   2. Underground Service Laterals: Schedule 40 rigid PVC in horizontal runs with rigid galvanized steel elbows turning up to vertical RGS.
   3. Where subject to moisture or mechanical injury - RGS conduit.
   4. ALL conduits exposed to moisture or subject to mechanical damage shall be RGS. Where conduit exits building, the changeover from EMT to rigid shall be inside exterior wall.
   5. In open shop and industrial installations RGS shall be run to 10' A.F.F.
   6. All conduit exposed on the outside of the building envelope shall be Rigid Galvanized Steel (RGS) conduit. This includes all conduits on and/or under canopies or awnings.
   7. In concrete or solid masonry – RGS conduit
   8. Above furred spaces or in cells of hollow masonry - EMT
   9. Concealed inside drywall construction walls and above lay-in ceilings – EMT.
   10. Exposed conduits:
      a. Conduits installed exposed in shop, warehouse, and manufacturing areas shall be RGS up to 12' A.F.F. Conduits in such spaces above 12' A.F.F. may be EMT unless indicated otherwise on the drawings.
      b. Exposed indoors in non-hazardous unfinished areas not subject to physical damage - EMT
      c. Exposed in kitchen and dishwashing areas: Rigid aluminum.
   11. Branch circuits in slab (3/4" and larger) - PVC. Turn up through slab with RGS ells - no exceptions. Extend rigid turn-ups 2" minimum above finish floor level.
   12. Circuits beneath building vapor barrier - PVC. Turn up through slab with RGS ells - no exceptions. All elbows 45^{o} and greater shall be RGS. Extend RGS turn-ups 2" minimum above finish floor level.
   13. Below Grade – PVC with RGS, or rigid aluminum where applicable, elbows turning up to vertical. All below grade elbows 45^{o} and greater shall be RGS.
   14. Motor, HVAC equipment, and vibrating equipment connections - flexible metal conduit, liquid tight flexible metal conduit outdoors, in kitchen and dishwashing area, or in other wet areas. Liquidtight flexible nonmetallic conduit shall be used only where specifically indicated.
   15. IMC may be used where RGS is indicated.

B. Conduit sizes:
   1. Unless specifically indicated otherwise herein or on the drawings, the minimum conduit size shall be 3/4".
      a. All conduits installed below grade or below slab shall be ¾" minimum.

b. The minimum size for flexible lighting fixture “whips” shall be 3/8” and the maximum length shall be 6 feet. Lighting fixture “whips” shall be defined as flexible conduits with conductors feeding one or more recessed lighting fixtures installed in suspended, lay-in, acoustical ceiling systems from a single junction box.
c. ½” conduit may be for final connections to equipment or fixtures where conduit is less than three (3) feet in length and is extended from a junction box or from a ¾” conduit stub up.

2. Conduits shall be sized in accordance with the National Electrical Code as adopted by the local authority having jurisdiction or as amended to date, except where a larger size is indicated on the drawings or specified herein.

C. Layout:
1. Generally, follow the conduit layout shown on the drawings. However, the layout is diagrammatic only and must be adjusted for structural conditions, built-in equipment and other factors. Offsets are not indicated and must be furnished as required.
2. Install all conduits concealed except in equipment rooms and where exposed runs are specifically indicated.
3. Install conduit runs to avoid proximity to steam or hot water pipes. In no place shall a conduit be run within 6" of such pipes except where crossings are unavoidable, then conduit shall be kept at least 1" from the covering of the pipe crossed.
4. Eliminate trapped runs insofar as possible.
5. Do not chase new work, but instead build in conduit as work progresses.
6. Do not run conduit in cavity of exterior walls.
7. Run concealed conduits in direct line with long sweep bends and offsets where practicable.
8. Install exposed conduit with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings, with right-angle turns consisting of cast-metal fittings or symmetrical bends.
9. Where conduits are indicated exposed overhead, runs down to wall outlets shall be concealed in wall.

D. Conduit Installation:
1. Securely fasten conduits to all sheet metal outlets, cabinets, junction and pull boxes with locknuts and bushings, taking care to see that stout mechanical and solid electrical connections are obtained.
2. All conduits shall have bushings with smooth beveled throats installed at both ends prior to installing conductors. Split bushings around conductors shall be taken to indicate that the conductors were pulled into conduit without the proper bushings installed and a basis for requiring the replacing of the conductors.
3. Conduits entering service enclosures (panelboards, disconnect switches, switchboards, motor control centers, etc. used as service entrance equipment) shall be provided with specification grade, insulating, grounding type bushings. Grounding bushing shall be bonded together and bonded to the service grounding buss.
4. Support:
a. Raceways shall be securely and rigidly supported to the building structure in a neat and workmanlike manner, and wherever possible, parallel runs or horizontal conduit shall be grouped together on adjustable trapeze hangers.
b. Support shall be provided at appropriate intervals <u>not</u> exceeding eight (8) feet with straps, hangers, and brackets specifically designed for the application.
c. Channels shall be 1 inch for 18-inch wide trapeze, 1-3/8 inch for 24 to 30 inch, and 1-5/8 inch for over 30-inch wide trapeze.
d. Perforated steel straphangers, “butterfly clips”, or tie-wire supports are <u>not</u> acceptable.
e. Conduits shall not be supported from ceiling support wires.
f. Conduit shall not be supported from mechanical system ducts or piping.

g. Conduits installed along wall surfaces shall be supported with galvanized steel brackets specifically designed for conduits and sized for the conduit used.
h. PVC conduits shall be supported per the NEC with PVC or stainless clamps and stainless-steel hardware.
h. Attach to supporting devices with screws, bolts, expansion sleeves or other workmanlike means appropriate to the surface.
i. In stud walls, anchors shall be completely rattle proof.
j. For conduits in damp and wet locations, use stainless steel clamps and stand-offs, or galvanized malleable or cast-iron clamps and spacers.
k. All mounting hardware for aluminum conduit shall be stainless steel.
l. Surface mounted conduits installed in kitchen and dishwashing areas shall be supported off walls approximately 3/16".

5. Thread rigid conduits so that the ends meet in couplings; cut ends square, ream smooth and draw up tight.
6. All field cut threads shall be cleaned with a solvent such as mineral spirits and painted with two coats of galvanize primer.
7. Cap conduit ends to keep out water and trash during construction.
8. Field made bends:
   a. Avoid field-made bends where possible, but where necessary, use a proper hickey or conduit-bending machine.
   b. Field made bends in PVC conduit shall be made with a heated PVC conduit bender.
   c. Make no bends with radius less than six times the conduit diameter, nor more than 90 degrees.
9. Make changes in direction with pull boxes, symmetrical bends and/or cast-metal fittings.
10. Total bends in any conduit run shall not exceed the equivalent of four, quarter (90^o) bends for a total of 360^o, per NEC, between pull boxes.
11. Replace any crushed or deformed conduits.
12. Conduits passing through roofs shall be in place before roof is installed.
13. Conduits installed in concrete/grout filled CMU walls shall be Rigid steel or IMC conduits installed field wrapped with 0.010 inch-thick pipe-wrapping plastic tape applied with a 50 percent overlay. Painted on coating shall not be acceptable.
14. Where conduits pass through or across building expansion joints, provide hot-dipped galvanized expansion fittings with bonding jumpers.
15. Ensure that all penetrations of firewalls are sealed per NEC and IBCC.
16. Right and left couplings shall not be used; conduit couplings of the Erikson type shall be used at location requiring such joints.
17. Paint all conduits exposed in finished spaces. Paint shall consist of one coat of zinc rich primer plus two top-coats of water-based latex paint, color to match adjacent finishes. Verify colors and paint system with Architect.
18. All conduit runs entering the building from outdoors shall be sealed against moisture migration and condensation by filling with insulating type foam.
19. All conduits passing through walls of coolers or freezers shall have seal fitting installed on the outside of the cooler/freezer wall and within 3" of the wall. Fitting shall be sealed per manufacturer's recommendations.
20. All conduits exposed to water shall have flexible conduits with a drip curve in conduit to keep from allowing water run into enclosure and provide a Myers hub connector to the enclosure.
21. Install telephone, data, intercom, and signal system raceways, 2-inch trade size and smaller, in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.

E. Below grade and below slab conduit installation:

1. See Section 16100, “Excavation, Cutting, and Backfilling” for trenching and backfilling requirements.
2. Rigid steel or IMC conduits installed below slab-on-grade or in the earth shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system. Painted on coatings shall not be acceptable. Wrap shall extend a minimum of 1” above slabs or 3” above finished grade where there is no slab. Alternate methods must be approved by Engineer prior to bids.
3. Top of the conduit shall be not less than 30 inches below grade.
4. Run conduit in straight lines except where a change of direction is necessary.
5. Conduits stubbed up from below grade or slab into exterior walls shall be turned toward the interior of the building below slab fill perpendicular to the wall. Conduits shall not be turned out toward the exterior unless specifically indicated to do so.
6. Placing of conduits below slab on grade:
    a. Conduits 1-1/4” and larger shall be installed a minimum of 12” below the bottom of slab in the clay/sand fill below any gravel fill material.
    b. Conduits 1” and smaller may be installed in the porous/gravel fill below the vapor barrier.
7. Multiple Conduits:
    a. Separate multiple conduits by a minimum distance of 2-1/2 inches horizontally and 3 inches vertically, except that light and power conduits shall be separated from control, signal, and telephone conduits by a minimum distance of 3 inches horizontally and vertically.
    b. Where multiple layers of conduits are to be placed in a trench, each layer shall be placed in the trench, straight and parallel, clear fill material (see Excavation, Cutting, and Backfilling) placed and tamped in place to provide the specified spacing, and each subsequent layer placed in the same manner.
    c. Stagger the joints of the conduits by rows and layers to strengthen the conduit assembly.
    d. Conduits shall not be placed haphazardly in the trench.
8. Where conduits pass through footings or foundation walls:
    a. Conduits roughed in beneath slab shall exit the foundation perpendicular to the building spaced approximately 3" apart. Conduits shall be arranged in a single horizontal row where practical.
    b. Secure approval from the Architect and Structural Engineer prior to penetrating any footing or foundation wall.
    c. Schedule 40 PVC sleeves shall be cast in the footings or foundation wall for the conduits to pass through.
    d. Multiple sleeves shall have 3” clearance, vertically and horizontally, between the sleeves unless directed otherwise by the Architect and/or Structural Engineer.
9. Where PVC conduit is installed below grade a PVC to rigid metallic conduit coupling shall be installed in the horizontal run and a rigid galvanized steel conduit elbow installed to turn up to above grade. Where above grade conduits are indicated to be rigid aluminum the elbow turning up to vertical shall be rigid aluminum.
10. Rigid aluminum conduit shall be wrapped same as RGS through concrete from 2” each side of the concrete.
11. Rigid galvanized conduit shall extend a minimum of 6” above the finished floor level.
12. In hazardous areas the coupling shall be below grade and a single section of conduit installed up to 18” A.F.F. to accept the required seal fitting.
13. Wiring shall be extended in rigid threaded conduit to equipment, except that where required, flexible conduit may be used from 6 inches above the floor to the served equipment.
14. Conduits shall exit concrete slabs vertically.

a. Where adequate support cannot be obtained by wiring to reinforcing steel, obtain support with solid iron stakes (which may be driven through membrane) cut off flush with slab after pouring.
b. At turn-ups of adjacent runs of exposed conduit, obtain alignment by wiring members to a temporary horizontal member.

15. Empty or spare conduit stub-ups shall be capped with a threaded cap.
16. Encasement Under Roads, Structures, and at other locations indicated on the drawings:
    a. Under roads, paved areas, railroad tracks, and other locations indicated on the plans install conduits in concrete encasement of rectangular cross-section providing a minimum of 3-inch concrete cover around ducts.
    c. Provide plastic duct spacers that interlock vertically and horizontally. Spacer assemblies shall consist of base spacers, intermediate spacers, and top spacers to provide a completely enclosed and locked-in conduit assembly.
    d. Install #4 rebar at each corner of the encasement and at not more than 18” on center vertically and horizontally on the sides of the encasement. #4 rebar hoops shall be installed at not more than 18” on center along the length of the encasement.
    e. Concrete encasement shall extend at least 5 feet beyond the edges of paved areas and roads, and 12 feet beyond the rails on each side of railroad tracks.
17. Conduits to be installed under existing paved areas, which are not to be disturbed, and under roads and railroad tracks, shall be installed through a zinc coated, rigid steel, sleeve, jacked into place.
18. Conduits installed between handholes, manholes or other accessible areas shall have a minimum slope of 3 inches in each 100 feet away from buildings and toward manholes and other necessary drainage points.
19. The contractor shall provide properly rated and sized junction and pull boxes as required on all underground conduit runs 150 feet and greater so as to minimize pulling tensions on cables to be installed in conduits. In no case shall pull or junction boxes be further than 300 feet apart. Provide pulling tension calculations on all underground runs over 200 feet as required in Paragraph 1.09 Submittals.

F. Conduit Installation in concrete slabs:
    1. Conduit installed in concrete slabs shall be rigid steel or IMC. Rigid steel or IMC conduits installed in slabs-on-grade shall be field wrapped with 0.010 inch-thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system. Painted on coatings shall not be acceptable.
    2. At slabs on grade, conduit, 3/4" maximum, may be run in the slab; larger conduit shall be run below slab.
    3. Where adequate support cannot be obtained by wiring to reinforcing steel, obtain support with solid iron stakes (which may be driven through membrane) cut off flush with slab after pouring.
    4. At turn-ups of adjacent runs of exposed conduit, obtain alignment by wiring members to a temporary horizontal member.

G. Flexible conduit:
    1. At motor or equipment connections:
        a. The maximum length allowable for flexible conduit shall be 36 inches except at lighting fixtures.
        b. Flexible conduit installed outdoors shall be installed so as to provide an 8 inch minimum drip loop as measured from the lowest end of the conduit.
    2. At lighting fixture connections provide flexible steel conduit by one of the manufacturers named for rigid.
        a. Maximum length allowable shall be 72 inches.

b. Support flexible conduit such that it does not contact the ceiling system, ductwork, or other equipment above the ceiling. The conduit shall not be attached to a ceiling or ceiling support system.
c. All fixture whips shall be supported within 12” of outlet/junction boxes with single hole clamps.

H. Empty conduit:
1. Install a #14 galvanized fish wire or polypropylene pull cord with 14-inch free ends in all empty power and/or auxiliary conduits.
2. All conduits indicated to be terminated above the ceiling shall have an elbow turned out above the ceiling and shall be terminated with an insulating bushing.
3. Empty conduits stubbed out of buildings below grade:
a. Empty conduits stubbed out of buildings below grade shall extend 5 feet outside of the building foundation.
b. Install a 12”x 12”x 6” concrete marker at grade, above the end of the conduits, with “ELEC” inscribed on top.
f. Note on as-built drawings the exact location where empty conduit(s) are stubbed out below grade to the building exterior. Indicate conduit sizes and number of each size.
g. The contractor shall provide properly rated and sized junction and pull boxes as required on all underground conduit runs 150 feet and greater. In no case shall pull or junction boxes be further than 200 feet apart.

I. Conduit entries into enclosures, panelboards, and wiring troughs:
1. Layout conduit entries carefully to allow clearances for the number and sizes of conduits, electrical equipment, and future expansion.
2. In sheet metal equipment use Greenlee Knock-Out punch, or equal, to cut holes for conduit installation. Do not drill holes or cut holes out with snips or torch.
3. In cast enclosures and boxes drill conduit openings with correct size drill for tight fit.

J. **All junction box covers above the ceiling shall be labeled to which circuits or systems they contain**.

3.12. CONDUIT BODIES:

A. Conduit bodies shall be sized in accordance with NEC 370, and 373.
1. Conduit bodies for conductor sizes AWG #4 and larger shall be mogul type bodies sized in accordance with NEC 370-28.
2. Conduit bodies for conductor sizes AWG #6 and smaller shall be sized in accordance with NEC 370-16(c).

3.13. JUNCTION AND PULL BOXES:

A. Junction and pull boxes shall be sized per NEC to accommodate the installed number and size of conductors and conduits.

B. Boxes shall be securely fastened in place.

C. Boxes serving lighting fixtures installed in accessible, suspended ceilings:
1. Provide number of boxes as required to maintain fixture whips within the 6’ maximum length.
2. Generally, attach to underside of structure above, in accessible location, to accommodate a maximum 6' flexible conduit connection to each fixture or fixture run.
3. Where the structure above is more than 18” above the ceiling the boxes shall be supported within 18 inches of the ceiling with all thread rod and/or strut.

D. Install galvanized steel utility box plates, by box manufacturer, at exposed conduit fittings or boxes.

E. **All junction box covers above the ceiling shall be labeled to which circuits or systems they contain**.

3.14. WIRE AND CABLE INSTALLATION:

A. No conductor shall be smaller than #12 except where so designated on the drawings or specified elsewhere.

B. Multiwire lighting branch circuits shall be used where indicated.

C. Wiring devices shall be connected such that each device can be removed without interrupting the neutral or equipment grounding conductors serving other outlets on the same circuit(s).

D. Joints and splices in wire shall be made with solderless connectors and covered so that insulation is equal to conductor insulation. Wire nuts shall not be used for conductor #8 and larger.

E. No splices shall be pulled into conduit.

F. Both conductors and conduit shall be continuous from outlet to outlet.

G. No conductor shall be pulled into the conduit until the conduit is cleaned of all foreign matter.

H. When installing parallel conductors, it is mandatory that all conductors making up the feeder be exactly the same length, the same size, and type of conductor with the same insulation. Each group of conductors making up a phase or neutral must be bonded together at both ends in an approved manner.

I. MC cable or Romex cable will note be accepted unless specifically called for on drawings.

J. Wiring thru light fixtures and receptacles will not be accepted.

3.15. AUXILIARY GUTTERS (WIRING TROUGHS):

A. Auxiliary Gutters shall be sized per NEC to accommodate the installed number, size, and orientation of conductors and conduits.

B. Conductors serving a gutter shall be extended without reduction in size, for the entire length of the gutter.

C. All taps and splices shall be made with insulated multi-tap connectors.

3.16. CIRCUITS AND BRANCH CIRCUITS:

A. Outlets shall be connected to branch circuits as indicated on the drawings by circuit number adjacent to outlet symbols, and no more outlets than are indicated shall be connected to a circuit.

3.17. WIRE JOINTS:

A. Except for motor circuits, wire joints for #8 and smaller wire shall be made with twist on connectors.

B. Wire joints and splices for motor circuits, for conductors #6 and larger, and for smaller conductors where other connectors are not rated for the number of conductors involved shall be made with split bolt connectors rated for the applicable conductor size, number of conductors, and conductor material.
   1. Properly tape and insulate all joints to attain the same insulation rating as the cable insulation.
   2. Splices for #6 through #1 shall have a minimum or two (2) layers of rubber tape covered by a minimum of three (3) layers of electrical tape.
   3. Splices for #1/0 and larger conductors shall have a minimum of two (2) layers of electrical filler tape covered by a minimum of three (3) layers of electrical tape.

C. Splices in control conductors shall be avoided as much as possible. Stranded control conductor up to #12 may be connected or spliced with hand crimped type compression connectors. The connectors shall be of the proper size for the conductors being connected.

D. Splices and joints made with mechanical/hydraulic type compression connectors:
   1. Connections and splices shall be made with connectors rated for the applicable conductor size and conductor material.

2. Dies used shall leave the die number embossed in the connector. The Contractor shall provide the Engineer with the Manufacturer's connector and die chart prior to final inspection.

E. Taps and splices in auxiliary gutters/troughs shall be made with insulated multi-tap connectors.

F. Wire joints and splices made below grade shall be made with UL listed waterproof connectors, wire nuts, or splice kits.

G. All joints and splices shall be made in junction boxes, wiring troughs, or conduit bodies sized per NEC.

H. All connections to switchboards, panelboards, transformers, generators, ATS, or any other type electrical distribution type equipment shall be compression type fittings. Mechanical fittings will not be accepted in these applications.

3.18. STRUT SYSTEM FOR SUPPORT OF ELECTRICAL EQUIPMENT:

A. Strut Systems: Strut shall be utilized to rack exposed piping vertically or horizontally on walls and across slabs (where applicable). Strut may be utilized to support piping above ceilings, for support of equipment, and elsewhere as deemed appropriate.
1. Strut in conditioned spaces and above accessible ceilings shall be electro-galvanized.
2. Strut installed outdoors, in mechanical rooms, and in other unconditioned spaces shall be hot-dipped galvanized.
3. Strut installed in waste-water treatment facilities, kitchens, dishwashing spaces, and labs shall be stainless steel.
4. Strut fittings and hardware, including anchors, shall be same material as strut.
5. Saw cut strut square, 6" minimum lengths. Strut on continuous runs of pipe shall be same length. File or grind burrs from saw cuts.
6. After installation, electro-galvanized and hot-dipped galvanized strut shall be painted with two coats of zinc primer.

3.19. OUTLET BOX INSTALLATION:

A. General: The drawings indicate approximate locations only; determine the exact location at the building in view of all structural and architectural conditions. Obtain Architect's verification of final locations.

B. Outlet boxes shall be sized per NEC to accommodate the installed number and size of conductors, wiring devices, and conduits.

C. Ceiling and Wall Bracket Outlets: 4" octagonal boxes with plaster rings appropriate for finish surface.

D. Typical boxes (for switches, receptacles and auxiliary systems): 4" square boxes ganged as required. Furnish with 3/4" plaster rings where employed in plaster, 1" tile covers where used in ceramic tile, 1" plaster rings where set in exposed concrete, and otherwise appropriate for surface and construction.

E. Boxes in Exposed (or Thin-Coat Plastered) Masonry: Where conduit connections permit, employ solid flush-type, square-cornered, masonry boxes with turned-in device holders; otherwise employ typical box with 1-1/2" square-cut tile cover. .

F. Boxes used with Exposed Conduit: 4" square utility boxes.

G. Exterior Boxes: Cast-metal boxes, Crouse-Hinds Type FS or FD as appropriate. Make weatherproof with gasketed covers. Equal products by Appleton, Killark, O-Z/Gedney, or approved equal will be accepted.

H. Boxes used with Recessed Lighting Fixtures in suspended acoustical tile ceilings:
1. Provide a 4" square box with blank cover adjacent to each fixture or fixture group.
2. Install a flexible metal conduit fixture-"whip" from the box to the fixtures. The "whip" shall not be longer than 72".

3. Attach the box to the underside of the structure above, in an accessible location, not more than 18” above the lay-in ceiling.
4. Where structure is more than 18” above the ceiling, the boxes shall be supported from all-thread rods, strut, or a combination of rod and strut.

I. Boxes in Dry Wall Construction:
   1. Outlet boxes shall be securely fastened in place.
   2. Outlet boxes installed in metal stud construction shall be supported by brackets screwed to studs. Clip on brackets shall not be accepted.
      a. Where a single outlet box is installed adjacent to a stud, brackets may attach to a single stud with a brace against the back of the opposite wall. Use a bracket equal to Caddy Fasteners “H” Series.
      b. Where outlets do not fall next to a stud or where more than one outlet is installed between studs use a metal bracket attached to both studs. Brackets shall be equal to Caddy Fasteners “SGB", “TSGB”, or “RBS” series brackets.
      c. Outlet boxes three gangs and wider shall be supported with support member screwed to the two adjacent studs. Brackets equal to Caddy Fasteners SGB or TSGB brackets may be used.

J. Sectional type switch boxes at least 2-1/2" deep may be used instead of typical box (but not where dry wall finish is applied over masonry back-up and not where multi- gang devices occur).

K. Outlets in unfinished masonry walls may be slightly adjusted upward or downward to suit masonry courses, provided outlets are mounted at uniform heights throughout the installation.

L. Coordinate installation of outlet boxes in masonry walls with the masonry contractor to insure that boxes are flush with face of wall and grouted smooth around boxes such that covers, fixtures or devices install flush on face of wall.

M. Where outlets at different levels are shown adjacent, install in one vertical line where possible. Avoid conflict with wainscot caps, splash backs and upper cabinets by adjusting height slightly up or down as directed.

N. Back to back boxes shall be staggered with at least 3 inches between boxes.

O. Back to back boxes in fire rated partitions shall have a minimum of 24” horizontal and/or vertical separation between them.

P. Backs of boxes three gang and larger installed in fire rated partitions shall be wrapped with self adhesive fire stopping tape.

Q. Locate switch outlets on the lock side of doors and so that the first switch in a single or gang installation is approximately 6" to 10" from the doorjamb. Verify door swings on Architectural Drawings.

R. Dimmers shall be ganged together in accordance with the manufacturer’s instructions where appropriate but shall not be ganged with toggle switches.

S. Coordinate carefully with appropriate trades the size and orientation (vertical, horizontal) of outlet boxes for thermostats, data outlets, fire alarm equipment, security equipment, and other control and communications outlets.

T. Mounting Heights:

Confirm all mounting height with local codes and authorities prior to bid and adjust as required:

Switches, generally	48" A.F.F. to top of outlet
Safety switches	Center of Switch 48" A.F.F. or as required.
Receptacles, generally	16" A.F.F. to bottom of outlet
Receptacles over counters	Bottom of outlet 6” above countertops or 2” above backsplashes
Wall mounted exit and emergency lights	Bottom of fixture 7’- 6” A.F.F. or 12” below

	Ceiling whichever is lower
Thermostat	Top of outlet 48" A.F.F. or as noted by mechanical drawings.
Electric Water Coolers	Coordinate location with plumbing contractor to locate the receptacle(s) concealed within the EWC enclosure per manufacturer's installation instructions.

U. Install blank coverplates on all unused power and auxiliary outlet boxes. Blank coverplates shall match other cover plates installed in the facility.

V. Furnish blank plates, matching those on the other outlets in the same area, on TV outlets and other outlets installed for future use.

3.20. WIRING DEVICES:

A. Install wall devices vertically' unless otherwise noted, so that all devices of any given height will align exactly.

B. Where boxes are not flush or square with the finished wall surface install wiring devices utilizing a leveler and retainer equal to Caddy #RLC or Steel City #SSF-SR.

C. Plates shall be plumb and true with all four edges contacting wall surface.

D. Mount receptacles with grounding terminals down.

E. Do not install devices until plastering or other type wall covering has been completed; install ahead of painting work but protect from paint spatter.

F. Use screw terminal connections only.

G. Do not gang dimmer switches with toggle switches.

H. Each single or multi outlet receptacle, other than straight blade, 15 or 20 amp, 120 volts, NEMA 5-15R or NEMA 5-20R, shall be provided with matching cord plugs and a minimum of 8 feet of Type SOW cable matching the receptacle size and configuration.

I. Pin and sleeve plugs for food service equipment shall be provided with a Type SOW cable connected to the equipment and plug of sufficient length to reach from the equipment to the plug with a minimum of 18" slack cork. Minimum length shall be 6 feet from equipment to plug.

J. Provide "Kellums" type grips at the plug, cord connector, and for overhead support on all overhead cord connector drops.

3.21. OCCUPANCY SENSORS AND ASSOCIATED DEVICES FOR LIGHTING CONTROL:

A. Occupancy sensors and associated devices and circuiting shall be installed in strict accordance with the manufacturer's instructions.

B. Wall, corner mounted sensors shall be mounted as close to the ceiling as possible on the manufacturer'' corner mounting bracket.

C. Power packs shall be mounted above the ceiling. Power packs shall be installed utilizing two(2) 4" x 4" x 2-1/8" deep boxes joined together using the nipple on the powerpack in accordance with the manufacturer's instructions. One of the boxes shall contain the power pack and control wiring and the other shall contain the power wiring.

D. All control and power circuiting shall be in EMT conduit. Where the devices are not equipped with conduit connections the conduit shall be brought up as close as possible to the device and terminated with insulating bushings.

3.22. ELECTRICALLY POWERED EQUIPMENT AND CONTROLS:

A. Provide and install power circuits for all electrically powered equipment and controls.

B. Heating, Ventilating, and Air Conditioning Control Wiring and Conduit:

1. The electrical contractor shall be responsible for installing outlet boxes for flush mounted HVAC system thermostats in dry wall or masonry wall construction and, where called for

on the plans, for surface mounted metallic raceway in finished areas. Extend ¾" conduit from the outlet to above nearest accessible ceiling and terminate horizontally. Refer to the Mechanical/HVAC plans for thermostat locations and coordinate exact type outlet required and orientation with the Mechanical/HVAC contractor.

2. The Mechanical Contractor shall be responsible for the installation of all outlets and conduit for surface mounted devices in unfinished areas such as shops, warehouses, industrial facilities, etc.
3. The mechanical contractor shall furnish and install all low and line voltage control wiring required for the temperature control and/or ventilation systems.

C. Where Fire Alarm system duct mounted smoke detectors and HVAC shut down interface relays are provided, the Electrical contractor shall provide wiring from the smoke detectors to the HVAC shut down interface relay. All circuiting from the shut down relay to the HVAC controls and/or starters shall be provided and installed by the Mechanical/Controls contractor.

D. The mechanical contractor shall furnish all motor starters for the temperature control and/or ventilation equipment unless otherwise indicated on the electrical plans or elsewhere in these electrical specifications. The electrical contractor shall install all motor starters, except for equipment with factory installed starters, for the temperature control and/or ventilation equipment.

E. Where exhaust fans are supplied with field installed speed controllers, the Electrical Contractor shall provide all necessary circuiting to the fan/speed controller and between the fan and the speed controller.

3.23. DISCONNECTING MEANS:

A. Where required by the National Electrical Code and/or other applicable codes or authorities, or where indicated on the electrical plans, the electrical contractor shall furnish and install an approved disconnecting means for all electrically powered equipment and/or controllers for such equipment whether the disconnecting means is or is not shown on the electrical plans.

1. The location, rating, and enclosure for the disconnecting means shall be as required by the National Electrical Code and/or other applicable codes or authorities.
2. Manual motor starters with thermal overload protection may be used in lieu of safety switches for individual motors under 1 horsepower.
3. Motor rated switches may be used for the disconnecting means when supplied of correct voltage, phase, amperage rating, and enclosure type.
4. The disconnecting means shall be as manufactured by General Electric, Cutler Hammer, or Siemens. Square D will not be accepted.

B. Where the disconnecting means shown on the electrical plans has a rating greater than the required code rating, the greater rating device shall be installed.

C. An approved horsepower rated fusible safety switch shall be installed where the circuit overcurrent protection does not provide overload protection for the equipment served and where required to meet the equipment's listing requirements.

D. Motor rated switches may be used as service disconnect switches when supplied with a pad-lockable, handle locking guard.

E. Install an engraved phenolic nameplate on the front of each switch enclosure identifying the equipment served by the safety switch and source of power (i.e., panel name and circuit number). Plates shall be white with black lettering. The plates shall be permanently installed with stainless steel screws or stainless-steel rivets.

F. All disconnects installed in public areas or in areas readily accessible to the public shall be lockable and shall be furnished with a brass lock. Provide 10 keys for each lock. All disconnect locks furnished on the project shall be keyed alike.

3.24. LIGHTING FIXTURES:

A. The installation and support of all lighting fixtures shall be the responsibility of the Electrical Contractor.

B. Lay out work as shown, and to provide attractive and efficient arrangement.

C. Install fixtures level, plumb, and true with ceiling and walls, and in alignment with adjacent lighting fixtures.

D. Provide adequate and substantial supports for fixtures in accordance with manufacturers' directions and as specified herein.

E. A Re-lock system will not be accepted for installing lights.

F. Wire grid mounted luminaries individually to junction boxes with flexible conduit not more than 6 feet in length. Individual flexible connections shall be 2 #14 and 1 #14 ground THHN in 3/8" flexible conduit. Ground wire shall be bonded at each end.

G. Light fixtures with center baskets shall have all fixtures in a room installed with the center baskets oriented in the same direction.

H. Fixtures mounted in inverted “T” grids:
   1. For round fixtures or fixtures smaller in size than the ceiling grid, provide a minimum of two wires per fixture located within 4 inches of each corner of the ceiling grid in which the fixture is located. Do not support fixtures by ceiling acoustical panels. Fixtures shall be supported independent of the ceiling system or shall be supported by at least two metal channels spanning the grid system, and secured to, the ceiling tees. One support wire shall be attached to the center of the fixture or to each of the metal channels.
   2. Surface mounted fixtures:
      a. Surface mounted fixtures installed on lay-in ceiling systems shall be supported independent of the ceiling system form the building structure with a minimum of two (2) 3/8”, minimum, all-thread rods.
      b. Install nuts and washers on inside and outside of the fixture housing to provide a rigid installation.
      c. Provide cross bracing as required such that fixtures have no lateral movement.

I. All stems on lighting fixtures shall be installed as follows: (except fixtures with slide grip hangers) first and last stem in row in first knockout from end of fixture. One stem shall be installed between each two fixtures, stem shall center joint, where fixtures join, and attach by use of "jointing plates". Nipples with lock nuts and bushings shall connect all fixtures in continuous rows other than recessed grid type.

J. All suspended lighting fixtures shall be provided with chain or cable sway bracing to keep fixtures from swinging.

K. Fixtures installed in fire rated assemblies shall be tented in accordance with the specified assembly.

L. Means shall be provided to keep insulation 4” minimum away from fixtures not rated for direct contact with insulation.

M. Prior to final inspection clean fixtures and lamps with a soft cloth or sponge and detergent (not soap) solution.

N. All lighting fixtures installed in gymnasiums, hangars, high bay or similar use areas shall be equipped with wire guards.

O. All emergency and exit lights designated on drawings shall be provided with an 1100-lumen battery ballast.

P. All light fixtures shall be supported to the structure independent of the ceiling system on two opposite sides. Support wires shall be different color from ceiling support wires. Engage all ceiling mounting clips. If light fixture is not provided with grid support clips, then the contractor will be responsible to support the fixture on all four sides with support wires. See “Typical Lay-In Luminaire Detail” on drawings for further requirements.

3.25. PANELBOARDS:

A. Panelboards shall be installed where shown on the drawings.

B. Ratings and configurations shall be as scheduled and/or indicated on the drawings.

C. The Electrical Contractor shall coordinate installation of equipment in Electrical and Electrical/Mechanical spaces with other trades such that Code required clearances and working space around the electrical equipment is maintained.

D. Conduit termination:
   1. In general use panelboards with blank ends, without knockouts.
   2. Layout conduit entries carefully to allow clearances for drywall or CMU wall thickness, and to accommodate the number and sizes of home run conduits and specified spare conduits.
   3. Use Greenlee Knock-Out punch, or equal, to cut holes in panelboard ends and/or sides for conduit installation. Do not drill holes or cut holes out with snips or torch.

E. Phase arrangement in panelboards shall be per the NEC, phase A, B, C from front to back, top to bottom, or left to right as viewed from the front.

F. In Delta connected systems the “high” leg shall be the B phase and shall be clearly marked with an orange outer finish.

G. Multi-Section Panelboards:
   1. Sub-feed conductors shall be the same size as the conductors feeding the main section.
   2. Circuiting originating in one section shall not pass through another section.
   3. Circuit conductors and grounding conductors shall originate in the same panelboard section.
   4. A separate isolated grounding conductor shall be installed from the main section to the sub-feed section(s).
   5. Where the panelboard is rated for service entrance equipment the sub-feed section shall have a separate isolated ground buss fed from the main section ground buss.

H. Labeling:
   1. Each panelboard shall have an engraved phenolic plate permanently installed on the front of the panel with the panel name, current rating, and voltage rating.
   2. Where there is more than one nominal voltage system the panel shall also have an engraved phenolic plate describing the means of identification used to identify the phase and system of each ungrounded conductor of the system served by the panel.
   3. Plates shall be white with black lettering.
   4. Panelboard circuit numbers shall be as indicated on the panelboard schedules.

3.26. PHOTOELECTRIC CELLS, TIMERS, AND CONTACTORS FOR LIGHTING CONTROL:

A. Install time clocks where accessible.

B. Install photoelectric cells so that lighting fixtures do not affect the cell.

C. Adjust time clock(s) and photoelectric cells as required for proper operation.

3.27. DRY TYPE TRANSFORMERS:

A. Flexible metallic conduit equipped with bare stranded copper ground jumper shall be provided for all transformer primary and secondary connections

B. Transformer secondaries shall be grounded to the building steel and to the primary and secondary side conduit systems.

3.28. IDENTIFICATION AND LABELING:

A. Feeder Designation:
   1. Non-ferrous identifying tags or pressure sensitive labels shall be securely fastened to all cables, feeders, and power circuits in vaults, pull boxes, manholes, switch gear and at

termination of cables. Tags or labels shall be stamped or printed to correspond with markings on drawings so that feeder or cable number and phase can be readily identified.

2. Where there is more than one nominal voltage system, each ungrounded system conductor shall be identified by phase and system wherever accessible per NEC. The means of identification shall be permanently posted at each branch-circuit panelboard.

B. Color Coding of Conductors:
   1. The ungrounded (phase) conductors and the grounded (neutral) conductors of each voltage system shall be identified by the following color coding method:
      a. 120/240 Volts, Single Phase, 3 Wire:
         1) Grounded (Neutral) Conductor --- White
         2) Ungrounded (Phase) Conductors --- Red, Black
      a. 120/240 Volts, Three Phase, 4 wire:
         1) Grounded (Neutral) Conductor --- White
         2) Ungrounded (Phase) Conductors --- Red, Orange, Black
      b. 120/208 Volts, 3 Phase, 4 Wire:
         1) Grounded (neutral) Conductor --- White
         2) Ungrounded (phase) Conductors --- Black, Blue, Red
      c. 277/480 Volts, 3 Phase, 4 Wire:
         1) Grounded (neutral) Conductor --- Gray
         2) Ungrounded (phase) Conductors --- Brown, Orange, Yellow
   2. Green shall be used for equipment grounding conductors only.
   3. The insulation color shall be visible for the entire length of wire.

C. Panelboard:
   1. Each Lighting and Power Panelboard shall contain a typed circuit directory listing all circuit breakers and the load served by each.
   2. Panelboard directories shall be typewritten and shall include adequate descriptions for proper identification of individual circuits. Do not write in or on panelboards.
   3. On Distribution panelboards, provide and install an engraved laminated label for each circuit, indicating circuit's number and load served.
   4. Each panelboard shall have an engraved phenolic plate permanently installed on the front of the panel with the panel name, current rating, and voltage rating.
   5. Where there is more than one nominal voltage system each panelboard shall have an engraved phenolic plate describing the means of identification used to identify each phase, neutral, and grounding conductors of the system served by the panelboard per NEC.
   6. Plates shall be white with black lettering.

D. Wall Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on the wall plate.

E. Receptacles: Install a label on the face of the coverplate and tags or wire markers inside the outlet box identifying the panelboard and circuit number from which the outlet is served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of coverplate- black print on clear tape on light colored or stainless-steel plates and white print on clear tape on dark colored plates. Embossed tape labels will not be accepted. Use durable wire markers or tags within outlet boxes.

G. Disconnect Switches:
   1. Install an engraved phenolic nameplate on the front of each switch enclosure identifying the equipment served by the safety switch and source of power (i.e., panel name and circuit number).
   2. Plates shall be white with black lettering.
   3. The plates shall be permanently installed with stainless steel screws or stainless-steel rivets. Plates installed with glue or other adhesives will not be accepted.

4. Where motor rated switches are used as service disconnect switches, labeling shall be as described for receptacles.

H. Junction boxes: Identify circuits enclosed in concealed junction boxes on the cover with permanent marking pen.
   1. For power and lighting circuits indicate panelboard of origin and panelboard circuit number(s).
   2. For auxiliary systems circuiting indicate the system and zone served.

I. Service disconnects:
   1. An additional engraved sign shall be permanently attached next to panelboard circuit breakers, on enclosed circuit breaker enclosures, and/or on disconnect switches used as service disconnects to identify each main service disconnect.
   2. The sign shall be red with white lettering a minimum of ½" high.
   3. Where multiple main disconnects are utilized the labels shall identify each as one of a group, i.e., "Service Disconnect 1 of 3", etc. where there are three service disconnects.

3.29. SECONDARY SURGE ARRESTERS:

A. Secondary surge arresters shall be installed in strict accordance with the manufacturer's recommendations.

B. Arrester may be mounted to the side of a surface mounted panelboard or trough. If such a surface is not available, the arrester shall be mounted on a bracket in its own flush mount enclosure located immediately adjacent to the service panel. Ensure that all leads are attached per manufacturer's recommendations. Excess lead length shall be cut off prior to making connections.

3.30. CONCRETE:

A. The Electrical Contractor shall be responsible for placing concrete for electrical equipment pads, lighting standard bases, electrical equipment supports, and at other locations as indicated on the electrical drawings and/or specified herein.

B. This Contractor shall be responsible for size, location, and orientation of the pads, bases, etc. Any required additions or modifications to concrete due to incorrect size, location, or orientation shall be the responsibility of this contractor.

C. Concrete shall be cured for a period of not less than seven (7) days prior to setting poles, transformers, switchgear, motor control centers, or other pad mounted equipment.

D. Forms shall be completely removed after concrete has cured and prior to setting equipment.

E. A smooth wood float finish shall be given to exposed, unformed concrete.

F. Honeycombed, or otherwise defective areas of concrete shall be repaired by patching with cement mortar.

3.31. SPARE MATERIAL:

A. Provide two exit/emergency combo signs and 50 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.

B. Provide two emergency wall packs and 50 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.

C. Provide two type NEMA 5-20R receptacles complete with 75 feet of circuiting in conduit . For each device provide complete with all additional labor and materials for installation in a location as directed by the architect or engineer.

D. Provide two marked time wall switches and their installation.

E. Provide one spare set of fuses for each size and type fuse used.

3.32. EQUIPMENT TOUCHUP AND PAINTING:

A. Clean damaged and disturbed areas on all painted surfaces of enclosures, cabinets, and equipment, sand smooth, and apply primer, intermediate, and finish coats of paint to suit the degree of damage at each location. Paint shall be the manufacturer's supplied touch up paint or a matching paint. Prep all surfaces to be painted by removing all rust, dirt, oil, and any other material that might inhibit good paint adhesion by mechanical means and/or with solvents.

B. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.

C. Repair damage to galvanized finishes with two coats of zinc-rich paint recommended by manufacturer.
   1. Paint cut ends.
   2. Paint all drilled and punched holes.
   3. Paint all knicks and scratches.
   4. Paint all field cut conduit threads.

D. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 16715

STRUCTURED CABLING SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. General Requirements/Provisions shall be considered a part of this section and shall have the same force as if printed herein full. In addition, all information related to communications infrastructure that is documented in the architectural, structural, mechanical, and electrical drawings/documents shall be considered as part of the communications documents.

1.02 QUALITY ASSURANCE

A. Specifications, Standards and Codes: All work shall be in accordance with the following:

1. The current edition of the National Electrical Code (NFPA 70)
2. American National Standards Institute (ANSI)
3. National Electrical Manufacturers Association (NEMA)
4. Telecommunications Industries Association (TIA)
5. Electronic Industries Association (EIA)
6. Institute of Electrical & Electronics Engineers (IEEE)
7. Underwriters Laboratories (UL)
8. American Standards Association (ASA)
9. Federal Communications Commission (FCC)
10. Occupational Safety and Health Administration (OSHA)
11. American Society of Testing Material (ASTM)
12. Americans with Disabilities Act (ADA)
13. Local city and county ordinances governing electrical work
14. In the event of conflicts, the more stringent provisions shall apply.

1.03 SCOPE

A. The work under this section of the specifications shall include furnishing labor, material and equipment required to provide a complete installation of the work indicated on the drawings or as specified herein.

B. All material required to provide a fully operational system but not specifically mentioned or shown on the drawings, shall be furnished and installed without any additional charge.

C. The drawings and specifications are complementary to each other and what is called for by one shall be as binding as if called for by both. If a discrepancy exists between the drawings and specifications, the more stringent shall be included, and the engineer shall be notified of the discrepancy.

D. All structured cabling that is routed thru underground conduits shall be outside plant rated.

1.04 WORK INCLUDED

The Communications Infrastructure installed and work performed under this Division of the Specifications shall include but are not limited to the following:

A. Data Cabling Infrastructure

B. Wireless Access System Cabling

C. Communications raceways, cable tray, ladder rack, racks and equipment mounting backboards
D. Grounding and Bonding

1.05 DEFINITIONS

A. Terms: The following definitions of terms supplement those of the General Requirements and are applicable to Division 27 - Communications:
B. Provide: As used herein shall mean “furnish, install and test (if applicable) complete.”
C. Infrastructure: As used herein shall mean cable, conduit, raceway, cable tray or j-hooks with all required boxes, fittings, connectors, and accessories; completely installed.
D. Work: As used herein shall be understood to mean the materials completely installed, including the labor involved.

1.06 DRAWINGS

A. Drawings are diagrammatic and show the arrangement and location of pathways, outlets, support structures and equipment. The contractor shall carefully investigate the structural and finish conditions affecting his work and arrange his work accordingly. Should conditions on the job make it necessary to make adjustments to pathways or materials, the contractor shall advise the engineer in writing for approval before proceeding with such work.
B. Materials, equipment or labor not specifically indicated but required to form a complete system shall be provided. Drawings and Specifications do not indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.
C. The right is reserved to make reasonable changes in locations of equipment indicated on drawings prior to rough-in without increase in contract cost.
D. The contractor shall not reduce the size or number of conduit runs indicated on the drawings without the written approval of the Engineer.
E. Any work installed contrary to contract drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.
F. The location of equipment, support structures, outlets, and similar devices shown on the drawings are approximate only. Do not scale drawings. Obtain layout dimensions for equipment from Architectural plans unless indicated on communications plans.
G. Verify the ceiling type, ceiling suspension systems, and clearance above ceilings prior to ordering cabling and associated hardware. Notify the engineer of any discrepancies.
H. Review all architectural drawings for modular furniture layouts.

1.07 SUBMITTALS

A. Submit for approval, manufacture specifications of all materials, equipment and systems to be furnished. Work shall not proceed without the Engineer’s approval of the submitted items. Three (3) copies of the following shall be submitted:

1. Submittal specification sheets for individual items for equipment assemblies that consist of more than one item or component shall be submitted. Each specification sheet shall be reviewed and sealed by contractors RCDD. Partial or incomplete submittals will not be considered, reviewed or stored, and such submittals will not be returned except at the request and expense of the contractor.
2. Contractor shall generate shop drawings. Modify reviewed and accepted shop drawings to include revisions based upon completion of work. Submit shop drawings with record drawings on hard copy. Additionally, provide one electronic

copy of shop drawings in both AutoCad format (.dwg file) and Visio format(.vsdx file). Failure to submit electronic file with drawings will be grounds for immediate rejection.

3. Shop drawings shall include equipment racks, patch panels, termination blocks, connection details, rack mounting details and any other details not included in the construction drawings. All Submittal drawings shall be prepared and sealed by the contractors RCDD for approval.

B. Any materials and equipment listed that are not in accordance with specification requirements may be rejected.

C. The approval of material, equipment, systems and shop drawings is a general approval subject to the drawings, specifications and verification of all measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. The contractor shall carefully check and correct all shop drawings prior to submission for approval.

1.08 QUALITY ASSURANCE

A. Equipment and materials required for installation under these Specifications shall be the current model and new (less than one [1] year from the date of manufacture), unused and without blemish or defect.

B. Equipment shall bear labels attesting to Underwriters Laboratories, where subject to label service. Manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and be able to furnish proof of their ability by submitting affidavits and descriptive data about their product including size and magnitude comparable to requirements specified herein.

1.09 CONTRACTOR QUALIFICATIONS

A. The contractor shall have total responsibility for the coordination and installation of the work shown and described in the drawings and specifications. The contractor shall be a company specializing in the design, fabrication and installation of integrated communications systems.

B. Communication systems specified shall be installed under the direction of a qualified Contractor. Qualification requirements shall include submittal by the contractor to the engineer of the following:

1. List of five [5] previous projects of this scope, size and nature; including names and sizes of projects, description of work, time of completion and names of contact persons for reference.

2. Certification of contractor's manufacturer-authorization to provide material, perform installation and provide a minimum 25 year manufactures warranty for work to be performed under this contract. <u>This must be provided with submittals for approval.</u>

C. Contractor must have a Registered Communications Distribution Designer (RCDD) on staff. This individual must be a W-2 employee of data contractor. Various types RCDD contractors are not allowed for this project.

D. Submit copy of contractor's RCDD Certificate and resume for verification and approval at time of submittal.

E. All submittal documentation shall be prepared, sealed and signed by the contractors RCDD for approval.

F. Contractor shall have a certified BICSI Technician present at all times during the installation and/or testing of the entire Structured Cabling System.

G. Contractor must have an office regularly staffed on a daily basis with certified service and installation technicians within a 100 mile radius of the project site.

1.10 COORDINATION WITH OTHER TRADES

A. The Contractor shall coordinate communications work with that of other sections as required ensuring that the entire communications work will be carried out in an orderly, complete and coordinated fashion.

1.11 PERMITS

A. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by authorities having jurisdiction.

B.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Where equipment is identified by manufacturer and catalog number, it shall be as the base of requirements for quality and performance. Where manufacturers for equipment are identified by name, the Contractor may submit for approval, similar equipment of other manufacturers as substitution. The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.

B. All changes necessary to accommodate the substituted equipment shall be made at the contractor's expense and shall be as approved by the Engineer. Detailed drawings indicating the required changes shall be submitted for approval at the time the substitution is requested.

C. If substitutions are made in lieu of devices specified; form, dimension, design and profile shall be submitted to the Engineer for approval.

D. Submit request for approval of substitute materials in writing to the Engineer at least ten (10) days prior to bid opening for review.

2.02 MATERIALS

A. All materials used in this work shall be new and shall bear the inspection label of Underwriters' Laboratories Inc. or certification by other recognized laboratory.

B. The published standards and requirements of the Telecommunications Industries Association (TIA), National Electrical Manufacturers Association (NEMA), the American National Standard Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), and the American Society of Testing Materials (ASTM), are made a part of these Specifications and shall apply wherever applicable.

C. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts are available.

D. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer or partner manufacturers that offer a certified solution.

E. Components shall be compatible with each other and with the total assembly for the intended service.

PART 3 - EXECUTION

3.01 EXAMINATION OF CONDITIONS

A. Prior to the start of work, the Contractor shall carefully inspect the installed work of other trades and verify that such work is complete to the point where installation may properly commence. Start of work indicates acceptance of conditions.

B. Install equipment in accordance with applicable codes and regulations, the original design and the referenced standards.
C. In the event of a discrepancy, immediately notify the engineer in writing.
D. Do not proceed with installation until unsatisfactory conditions and discrepancies have been fully resolved.

3.02 PROTECTION OF SYSTEMS AND EQUIPMENT

A. Protect materials and equipment from damage during storage at the site and throughout the construction period. Equipment and materials shall be protected during shipment and storage against physical damage, dirt, theft, moisture, extreme temperature and rain.
B. During installation, equipment shall be protected against entry of foreign matter on the inside and be vacuum cleaned both inside and outside before testing, operating or painting.
C. As determined by the engineer, damaged equipment shall be fully repaired or shall be removed and replaced with new equipment to fully comply with requirements of the contract documents.
D. Damaged paint on any equipment or material shall be repainted to the same quality of paint, color, finish and workmanship as used by the manufacturer.

3.03 ACCESS TO EQUIPMENT

A. Equipment shall be installed in a location and manner that will allow convenient access for maintenance and inspection.
B. Working spaces shall be not less than specified in the National Electrical Code (NEC) for voltages specified.
C. Where the engineer determines that the contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled, one time only, as directed by the engineer, at no additional cost to the Owner. “Conveniently accessible” is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and duct work.

3.04 CLEANING

A. During construction, and prior to Owner acceptance of the building, remove from the premises and dispose of all packing material and debris caused by communications work.
B. Remove dust and debris from interiors and exteriors of all communications equipment.

3.05 COMPLETION

A. General: Upon completion of the work, remove excess debris, materials, equipment, apparatus, tools and similar items. Leave the premises clean, neat and orderly.
B. Results Expected: Systems shall be complete and operational and controls shall be set and calibrated. Testing, start-up and cleaning work shall be complete.

C. Maintenance Materials: Special tools for proper operation and maintenance of the equipment provided under this specification shall be delivered to the Owner.

PART 4 – HORIZONTAL CABLING

4.01 APPROVED PRODUCTS

A. Approved Horizontal Copper Cable Manufacturer(s)

1. Berk-Tek
2. Systimax
3. Hitachi

4.02 HORIZONTAL COPPER CABLE

A. 100 OHM Category 6 Balanced Twisted Pair Cable

1. The horizontal balanced twisted pair cable shall meet or exceed the Category 6 transmission characteristics per issue of ANSI/TIA-568-C.2.
2. Cable jacket shall be CMR or CMP rated (according to the space it occupies).
3. All Category 6 cabling shall be equal to Berk-Tek LANmark-1000 Enhanced Category 6 cabling
4. Jacket color shall be as shown on drawings.
5. Provide plenum rated in all plenum areas on project.

4.03 HORIZONTAL CABLES

A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
B. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
C. Cable raceways shall not be filled greater than the ANSI/TIA-569-B maximum fill for the particular raceway type.
D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
E. Riser rated cable shall be installed in metallic conduit when installed in a plenum space.
F. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
G. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.
H. If a J-hook or trapeze system is used to support cable bundles all horizontal cables shall be supported at a maximum of 48 to 60 inch (1.2 to 1.5 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids, conduit, pipes, duct work or panels.
I. Horizontal distribution cables shall be bundled in groups of no more than 50 cables. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
J. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes or other control devices.
K. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the Contractor shall install appropriate carriers from the building structure to support the cabling.
L. Any cable damaged or exceeding recommended installation parameters during

installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.

M. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA-568-C.2 document, manufacturer's recommendations and best industry practices.

N. Leave a minimum of 12" of slack for twisted pair cables at the outlet. Cables shall be coiled in the outlet box, surface-mount box or modular furniture raceway if adequate space is present to house the cable coil without exceeding the manufacturers bend radius. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.

O. Cables shall be neatly bundled and dressed to their respective termination device. Each terminating device shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.

P. Each cable shall be clearly labeled on the cable jacket behind the termination device at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

PART 5 – BACKBONE FIBER OPTIC CABLING

5.01 APPROVED PRODUCTS

A. Approved Optical Fiber Backbone Cable (Outside Plant) Manufacturer(s)

1. Berk-Tek 6 Strand OS2 Single Mode
2. Equals by Systimax, General, & Hitachi
3. Provide plenum rated in all plenum areas on project.

5.02 OPTICAL FIBER CONNECTOR ASSEMBLIES

A. Fiber Connectivity

1. The optical fiber connectors shall be factory terminated LC for installation onto single mode fiber.
2. The optical fiber connectors shall meet or exceed the performance criteria found in ANSI/TIA-568-C.3.
3. The optical fiber connectors shall be compatible with 900-micron buffered fibers or 250-micron loose-tube fibers.
4. All multimode fiber pigtail assemblies shall be installed by fusion splicing method only (No Exceptions).
5. All fiber enclosures shall be equipped with slack storage trays or slack management spools.
6. The loss of each connector shall not exceed 0.75 dB.
7. The fiber adapter panels shall be type LC.
8. The optical fiber adapter module that occupies the fiber patch panel shall be equipped with zirconia ceramic sleeve.

5.03 BACKBONE FIBER OPTIC CABLES (INSIDE PLANT)

A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practices.

B. Backbone cables shall be installed separately from horizontal distribution cables

C. A plastic or nylon pull cord with a minimum test rating of 90 Kg (200 lb.) shall be co-installed with all cable installed in any conduit.
D. Where cables are housed in conduits, the backbone and horizontal cables shall be installed in separate conduits
E. Exposed cables must be OFCP rated if installed in an air return plenum. Riser rated cables shall be installed in metallic conduit if installed in an air return plenum.
F. Where backbone cables and distribution cables are installed in a cable tray or wire way, backbone cables shall be installed first and bundled separately from the horizontal distribution cables.
G. Leave 10' of slack on each end of fiber backbone cable.
H. Backbone cables spanning more than three floors shall be securely attached at the top of the cable run with a wire mesh grip and on alternating floors or as required by local codes.
I. Vertical runs of cable shall be supported to messenger strand, cable ladder, or other method to provide proper support for the weight of the cable.
J. Large bundles of cables and/or heavy cables shall be attached using metal clamps and/or metal banding to support the cables.
K. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer's requirements.
L. Each optical fiber cable shall be individually attached to the respective enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.
M. Each optical fiber cable shall be clearly labeled at the entrance to the enclosure. Cables labeled within the bundle shall not be acceptable.
N. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers routed in the splice tray.
O. A maximum of 24 strands of fiber shall be spliced in each tray
P. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

5.04 BACKBONE FIBER OPTIC CABLES (OUTSIDE PLANT)

A. All OSP cables brought to the Entrance Facilities shall have 15ft of slack coiled and secured to the wall in the proximity of the fiber enclosure.
B. All cables shall be tagged and identified within each hand-hole/maintenance hole.
C. Place initial cables in bottom conduits to facilitate easy subsequent cable placement.
D. Place leader guard in the duct before placing cable to prevent damaging the cable sheath on the sharp edge of the duct.
E. Ventilate maintenance where gas has been detected before entering the maintenance hole.
F. To ensure that the optical fiber cable's qualities and characteristics are not degraded during installation, excessive pulling tensions and short bending radii will not be allowed. The maximum pulling tension is 600 lbs. The minimum bending radius for cable under tension is 20 times the outside diameter of the cable and for cable at rest is 10 times the outside diameter of the cable.
G. A 600 lb. break-away swivel, along with a slip clutch capstan winch that shows the dynamometer (pulling tension) reading, shall be used at all times during pulling.
H. Reels shall be continuously manned during cable installation.
I. Cable coils shall have at least two points of support on the optical fiber racking system.
J. When mounting the optical fiber slack coils, the minimum bend radius shall not be exceeded; this radius is equal to 10 times the outside diameter of the cable in a static application and 20 times the outside diameter in a dynamic application. At any time during the entire handling process of the optical fiber cable, as much care as possible should be maintained and all the manufacturer's recommendations should be followed.

5.05 OPTICAL FIBER CONNECTIVITY / SPLICING

A. Optical fiber connectors shall be installed as per the requirements specified by the manufacturer's installation guidelines.
B. All splicing shall be of the fusion type made under Light Injection and Detection Mode. The Contractor shall provide certified and experienced personnel for splicing.
C. Contractor's tools and equipment shall be in excellent working order. Any worn or improperly working tools shall be discarded and not used on this project. All fusion splicers shall be calibrated and labeled according to the manufacturer's specifications. Contractor shall submit certification of calibration for the fusion splicers to the Engineer.

PART 6 – FACEPLATES AND CONNECTORS

6.01 APPROVED PRODUCTS

A. Approved Copper Connectivity Manufacturer(s)

1. Leviton
   a) Cat 6 8P8C Connector Blue-Data Part #61110-RL6
   b) Cat 6 8P8C Connector Green-WAP Part #61110-RV6
2. Systimax
   a) Cat 6 8P8C Connector Blue-Data Part #2291216-6
   b) Cat 6 8P8C Connector Green-WAP Part #2291216-9
3. Hubbell
   a) Cat 6 8P8C Connector Blue-Data Part #HXJ6B
   b) Cat 6 8P8C Connector Green-WAP Part #HXJ6GN

B. Approved Faceplate Manufacturer(s)

1. Leviton
   a) 4 Port Stainless Steel Faceplate Part #43080-1L4
2. Systimax
   a) 4 Port Stainless Steel Faceplate Part #M14SP-L
3. Hubbell
   a) 4 Port Stainless Steel Faceplate Part #SSFL14

C. Approved Surface Mount Box Manufacturer(s)

1. Leviton 2 Port Surface Mount Housing Part #41089-2WP
2. Systimax 2 Port Surface Mount Housing Part #M102SMB-B-262
3. Hubbell 2 Port Surface Mount Housing Part #ISB2W

6.03 COPPER CONNECTIVITY

A. Voice/Data Jacks

1. Category 6, 8-Position, 8-Contact (8P8C) Modular Jack
   A. The connector module shall meet or exceed the Category 6 performance criteria per ANSI/TIA-568-C.2.
   B. The eight-position connector module shall accommodate six-position modular plug modular cords without damage to either the cord or the module.
   C. The connector module shall be designed for use at the work area (WA),

communications room (TR) and/or equipment room (ER) without modification.

D. The connector module shall be available in both the T568A and T568B wiring configurations within the same module.

E. The connector module shall have an insulation displacement connection featuring insulation slicing of 22 to 24 AWG plastic-insulated solid copper conductors forming a gas-tight connection.

F. Jack/Icon colors shall be:

1. See drawings for requirements

6.04 FACEPLATES

A. Faceplates

1. The faceplate housing the connector modules shall have no visible mounting screws.
2. The faceplate shall have a labeling capability using built-in labeling windows, to facilitate outlet identification and ease network management.
3. The faceplate shall provide flexibility in configuring multimedia workstation outlets that respond to present or future network application needs.
4. Each faceplate shall have a minimum of (4) ports per each outlet location. Each unpopulated port shall have a blank module installed that matches the color of the faceplate.
5. Faceplates shall be stainless steel unless noted otherwise. All faceplates shall match electrical outlet covers. Verify color and size of each faceplate prior to ordering.

6.05 SURFACE MOUNT BOXES

A. The surface mount box shall be sized to accommodate the quantity of outlets per each location as required.

B. A surface mount box shall be provided at each of the following locations: Projector, Wireless Access Point and/or any outlet location serving a ceiling mounted device.

C. Provide a minimum of 15ft of slack at each ceiling mounted outlet location. Slack loop shall be coiled up neatly and placed on a j-hook to support cable.

D. Verify location with owner prior to mounting.

6.06 COPPER CONNECTIVITY

A. 8-position, 8-contact (8P8C) modular jacks shall be installed in accordance with manufacturer's recommendations and installation guides, and best industry practices.

B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).

C. All outlet locations shall have color-coded 8P8C modular jacks installed. No cable shall be left unterminated.

6.07 FACEPLATES

A. Blank inserts shall be installed where ports are not used.

B. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation.

C. Faceplates shall be installed straight and level.

D. Faceplates shall be installed at the same heights as electrical outlets.

6.08 SURFACE MOUNT BOXES

A. Blank inserts shall be installed where ports are not used.
B. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation.
C. Surface mount boxes shall be installed straight and level.
D. Surface mount boxes shall be installed in an accessible area.

PART 7 – PATCH PANELS AND FIBER OPTIC ENCLOSURES

7.01 APPROVED PRODUCTS

A. Approved Patch Panel Manufacturer(s)

1. Leviton
   a) 24 Port Patch Panel Part #49255-L24
   b) 48 Port Patch Panel Part #49255-L48
2. Systimax
   a) 24 Port Patch Panel Part #M2000-1U
   b) 48 Port Patch Panel Part #M2000-2U
3. Hubbell
   a) 24 Port Patch Panel Part #UDX24E
   b) 48 Port Patch Panel Part #UDX48E

B. Approved Optical Fiber Enclosure Manufacturer(s)

1. Leviton
   a) 1RU Rack Mount Fiber Enclosure Part #5R1UM-S03
   b) 2RU Rack Mount Fiber Enclosure Part #5R1UM-S06
   c) 4RU Rack Mount Fiber Enclosure Part #5R1UM-F15
2. Systimax
   a) 1RU Rack Mount Fiber Enclosure Part #760147439
   b) 2RU Rack Mount Fiber Enclosure Part #760147447
   c) 4RU Rack Mount Fiber Enclosure Part #760147454
3. Hubbell
   a) 1RU Rack Mount Fiber Enclosure Part #FCR1U3SP
   b) 2RU Rack Mount Fiber Enclosure Part #FCR2U6SP
   c) 4RU Rack Mount Fiber Enclosure Part #FCR4U15SP

C. Approved Termination Block Manufacturer(s)

1. Leviton
2. Systimax
3. Hubbell

D. Category 6 Patch Panel

1. The Category 6 patch panel shall be compatible with 19" equipment racks, cabinets or wall mount brackets.
2. The Category 6 patch panels shall be 24 or 48 port unloaded patch panels.
3. The Category 6 patch panels shall be sized to accommodate one port for each cable installed plus 25% spare capacity for future growth. All ports shall be filled with a removable 8-position color coded modular jacks for each system. No port shall be left empty or blank.
4. The Category 6 patch panel shall be equipped with removable 8-position modular

jacks color coded for each system and shall allow for termination of both T568A and T568B wiring schemes.

5. Data and WAP cabling shall not occupy the same patch panel. All cabling for each system shall be installed in separate patch panels with color coded modular jacks to match as specified.
6. The Category 6 patch panel shall be equipped with front labeling windows to facilitate port identification.
7. The connector module shall meet or exceed the Category 6 performance criteria per ANSI/TIA-568-C.2.

7.02 OPTICAL FIBER PANELS/ENCLOSURES

A. Rack Mount Optical Fiber Enclosure

1. The rack mount optical fiber enclosure shall be equipped with a sliding drawer to access fibers.
2. The rack mount optical fiber enclosure shall be capable of terminating tight-buffered or loose tube optical fiber cable.
3. The rack mount optical fiber enclosure shall provide for bend radius control throughout the panel as well as storage space for slack cabling.
4. The panel/enclosure shall meet or exceed the performance criteria per ANSI/TIA-568-C.3.
5. The rack mount optical fiber panel/enclosure shall be equipped with optical fiber cassettes.
   A. The optical fiber adapter panels shall accommodate multimode terminated optical fiber.
   B. The optical fiber adapter panels shall be compatible with LC connectors.

7.03 PATCH PANELS

A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practice.
B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
D. Cables shall be neatly bundled and dressed to their respective patch panel. Each patch panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
E. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

7.04 OPTICAL FIBER PANELS/ENCLOSURES

A. Cables shall be dressed and terminated in accordance with the recommendations made in ANSI/TIA-568-C.0 and/or ANSI/TIA-568-C.1, manufacturer's recommendations and best industry practices.
B. Each cable shall be individually attached to the respective splice enclosure by mechanical means. The cables strength member shall be securely attached the cable strain relief bracket in the enclosure.
C. Bend radius of the optic fiber cable in the enclosure shall not exceed 10 times the outside diameter of the cable.
D. Each fiber bundle shall be stripped upon entering the splice tray and the individual fibers

routed in the splice tray.

E. Each cable shall be clearly labeled at the entrance to the splice enclosure. Cables labeled within the bundle shall not be acceptable.

F. A maximum of 24 strands of fiber shall be spliced in each tray

G. Fiber slack shall be neatly coiled within the fiber splice tray or enclosure. No slack loops shall be allowed external to the fiber panel.

PART 8 – PATCH CORDS

8.01 APPROVED PRODUCTS

A. Approved Copper Patch Cord Manufacturer(s)

1. Leviton
   a) Cat 6 Patch Cord Blue-Data Part #62460-XXL
   b) Cat 6 Patch Cord Green-WAP Part #62460-XXG
2. Systimax
   a) Cat 6 Patch Cord Blue-Data Part #UNC6-BL
   b) Cat 6 Patch Cord Green-WAP Part #UNC6-GR
3. Hubbell
   a) Cat 6 Patch Cord Blue-Data Part #HC6BXX
   b) Cat 6 Patch Cord Green-WAP Part #HC6GNXX

8.02 COPPER PATCH CORDS

A. Category 6 Patch Cords

1. Copper patch cords shall be installed as per the requirements specified by the manufacturer's installation guidelines.
2. The Category 6 patch cord shall be 4-pair, with 24 AWG solid or stranded copper conductors and 8-position modular plug.
3. The Category 6 modular cord cable shall be UL Listed as Type CMR.
4. The Category 6 patch cord shall meet or exceed the requirements of ANSI/TIA-568-C.2.
5. Lengths shall be 3', 5', 7' and/or 10' as required by the Owner.
6. Provide one patch cord for every cable installed that will be utilized for patching between patch panel and switches. Verify length and color with Owner prior to ordering.
7. Provide one patch cord for every cable installed at each work area outlet. Verify length and color with Owner prior to ordering.
   A. The Category 6 patch cord color shall be as indicated on drawings.

8.03 FIBER PATCH CORDS

A. Single-Mode Fiber Patch Cord (OS2)
   A. Fiber patch cords shall be installed as per the requirements specified by the manufacturer's installation guidelines.
   B. The optical fiber cord connector shall be LC.
   C. Lengths shall be 1m, 2m, and/or 3m as required by the application.
   D. Provide a minimum of (6) fiber optic patch cords per each IDF and a minimum of (6) fiber optic patch cords in the existing rack. Verify length with Owner prior to ordering.

PART 9 – EQUIPMNET RACKS AND ENCLOSURES

9.01 APPROVED PRODUCTS

A. Approved Equipment Rack/Cabinet Manufacturer(s)

1. Chatsworth Products, Inc.
   a) 2-Post Floor Mounted Equipment Rack Part #48353-703
   b) 4-Post Adjustable Server Rack Part #15213-703
2. Hoffman
   a) 2-Post Floor Mounted Equipment Rack Part #EDR19FM45U
   b) 4-Post Floor Mounted Server Rack Part #E4DRS19FM45U
   c) Wall Mount Equipment Rack Part #E19SWM25U24
3. Middle Atlantic

9.02 EQUIPMENT RACKS/CABINETS

A. Equipment Racks

1. The equipment rack shall be constructed of high strength, lightweight aluminum.
2. The vertical rails of the equipment rack shall be equipped with the EIA hole pattern.
3. 2 Post rack shall be: 7'H x 19"W floor mounted. Vertical channels shall be drilled and taped.
4. 4 Post rack shall be: 7’H with adjustable depth of 26-inches to 38-inches. Vertical channels shall have square punched mounting holes. Provide additional equipment mounting hardware, per each rack installed, to owner upon completion of the installation.
5. Provide a minimum of (50) 12X24 cage nuts with (50) 12X24 rack screws per each 4-Post rack and a minimum of (50) 12X24 rack screws per each 2-Post or wall mount rack provided/installed.
6. Rack color shall be black.

9.03 EQUIPMENT RACKS/CABINETS

A. Equipment racks shall be securely attached to the concrete floor using minimum 3/8" hardware or as required by local codes.
B. Equipment racks shall be installed as per the requirements specified by the manufacturer's installation guidelines.
C. Equipment racks shall be placed with a minimum of 36-inch clearance from each of the corresponding walls: front, rear and one side of the rack or as indicated on Drawings.
D. All equipment racks shall be grounded to the telecommunications ground bus bar.
E. Mounting screws not used for installing patch panels and other hardware shall be bagged and left with the rack or turned over to the owner upon completion of the installation.

9.04 BACKBOARDS

A. Backboards shall be 3/4" void free plywood. Size of backboard shall be 4' x 8' mounted vertically 18” A.F.F. unless otherwise noted differently on Drawings. Backboards shall be painted with two (2) coats of gray fire-retardant paint.

PART 10 – CABLE MANAGEMENT AND LADDER RACK

10.01 APPROVED PRODUCTS

A. Approved Horizontal Cable Management Manufacturer(s)

1. Chatsworth Products, Inc.
   a) 2RU Horizontal Cable Manager Part #35441-702
2. Leviton
   a) 2RU Horizontal Cable Manager Part #492RU-HFR
3. Systimax Equal
4. Hubbell Equal

B. Approved Vertical Cable Management Manufacturer(s)

1. Chatsworth Products, Inc.
   a) 6” Vertical Cable Manager Part #35521-703
   b) 8” Vertical Cable Manager Part #35522-703
2. Leviton
   a) 6” Vertical Cable Manager Part #4980L-VFR
   b) 8” Vertical Cable Manager Part #8980L-VFR
3. Systimax Equivalent
4. Hubbell Equivalent

C. Approved Ladder Rack System Manufacturer(s)

1. Chatsworth Products, Inc.
   a) 12” Ladder Rack Part #11275-712
   b) 18” Ladder Rack Part #11275-718
2. Hoffman
   a) 12” Ladder Rack Part #LSS12BLK
   b) 18” Ladder Rack Part #LSS18BLK
3. Middle Atlantic

D. Approved Tie Wrap/Velcro Strap Manufacturer(s)

1. Leviton
2. Or Approved Equal

10.02 CABLE MANAGEMENT - HORIZONTAL

A. Horizontal Cable Management

1. The horizontal wire manager shall be compatible with 19-inch equipment racks, cabinets or wall mount brackets.
2. The horizontal cable manager shall be double-sided to provide support/management for patch cords at the front of the panel and support/management of cables at the rear of the panel.
3. The horizontal cable manager shall be equipped with removable front and covers
4. The horizontal cable manager shall be 2 rack-units in height, installed above and below each patch panel and each switch as indicated on drawings.
5. Horizontal cable managers shall be black.

10.03 CABLE MANAGEMENT - VERTICAL

A. Vertical Cable Management

1. The vertical cable manger shall be 80” high double-sided, installed on both sides of all racks.
2. The vertical cable manager shall provide support/management for patch cords at the front of the rack and support/management of cables at the rear of the rack.
3. Vertical cable managers shall be installed on both sides of a single equipment rack. Where two (2) or more racks are positioned in a row, vertical cable managers shall be installed between each rack and each end of the row.
4. The vertical cable manager shall be a minimum width of 6".
5. Vertical cable manager color shall be black.

10.04 LADDER RACK

A. Ladder Rack System

1. See Drawings for ladder rack system details.
2. The ladder rack system shall be securely mounted with hardware (triangle brackets, top mounting plates, junction splice kits, butt splice kits, end caps, radius drop kits, etc.) designed for use with ladder rack systems per manufactures recommendations.
3. Ladder rack shall be 12” or 18” wide as indicated on drawings.
4. End caps shall be installed on the exposed ends of the ladder racks and channel supports. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
5. All sections of ladder rack shall be properly grounded to the corresponding telecommunications ground bus bar in each communications room.
6. Ladder Rack System color shall be black.

10.05 TIE WRAPS AND VELCRO STRAPS

A. Tie Wraps and Velcro Straps

1. Tie wraps/Velcro straps installed in air handling spaces must be plenum rated.
2. Backbone cables shall be fastened to support structures with tie wraps/Velcro straps.
3. Horizontal cables shall be fastened to support structures with Velcro straps.
   A. Tie Wraps shall be plenum rated red in color.
   B. Velcro Strap color shall be black.
4. Tie wraps/Velcro straps shall be installed around cables at intervals of 12" minimum.
5. Tie wraps shall secure cables to ladder racks using an “X” pattern.
6. Do not over-cinch cables.

10.06 D-RINGS

A. D-rings

1. D-Rings shall be used on backboards to support cables, patch cords and cross-connect wire.
2. D-Rings shall be made of high-strength, fire-retardant material with rounded edges to prevent damage to cable and wire insulation.
3. Provide D-Rings of appropriate size and quantity for proper cable management and support as required.

4. D-Rings shall be installed on 3/4" backboard, straight and level.

10.07 LADDER RACKS

A. Ladder rack system shall be installed straight, level and perpendicular to walls and ceiling slabs.
B. Ladder racks shall be supported at 4' intervals maximum.
C. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete ladder rack system.
D. Provide ladder rack system at minimum on (2) adjacent walls in each communications room or as indicated on drawings.
E. See Drawings for ladder rack system details.

PART 11 – PATHWAYS

11.01 APPROVED PRODUCTS

A. Approved Cable Tray System Manufacturer(s)
   1. Hoffman Quick Tray Pro Part #QTP4X18
   2. Wire Basket Tray Part #WBT4X18
   3. Or Approved Equal

B. Approved Cable Hanger Manufacturer(s)

   1. Erico Products – Caddy HP Series
   2. Hoffman
   3. Or Approved Equal

11.02 COMMUNICATIONS OUTLET BOXES

A. Outlet boxes and device covers shall be galvanized steel not less than 1/16" thick.
B. The dimensions of the outlet box shall be 4" x 4" square with a minimum depth of 2-1/8".
C. Outlet boxes shall be equipped with single gang device covers. Where installed in plaster, gypsum board, etc., covers shall be raised to compensate for the thickness of the wall finish.
D. Where outlet boxes are to be empty for future use, blank cover plates shall be used.

11.03 CABLE TRAY

A. Cable Tray System

   1. Cable tray shall be aluminum construction.
   2. Cable tray cross members shall be factory welded at 12" intervals maximum.
   3. Cable tray shall be equipped with one (1) or two (2) support rails that run the length of each segment.
   4. End caps shall be installed on the exposed ends of the cable tray, channel supports and bolts. Protective covers shall be installed on threaded rods that come in contact with cabling plant.
   5. Wall mount cable tray used in limited clearance areas shall be hook style and constructed of aluminum.

6. Provide all cable tray hardware accessory assemblies required to properly install cable tray system per manufactures requirements.
7. See Drawings for cable tray dimensions.

11.04 CABLE HANGERS

A. J-Hooks

1. J-hooks shall provide sufficient width to comply with required bend radii of high-performance cables. J-hook shall be cULus Listed.
2. J-hooks shall have flared edges to prevent damage while installing cables.
3. J-hooks sized 1 5/16" and larger shall have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces.

11.05 CABLE TRAY SYSTEM

A. Install trays in accordance with recognized industry practices, to ensure that the cable tray equipment complies with requirements of the NEC.
B. All open trays shall be installed a minimum of six (6) inches away from any light fixture.
C. Provide external grounding strap at expansion joints, sleeves, crossover and other locations where tray continuity is interrupted.
D. Support all pathways from building structure. Do not support pathways from ductwork, piping or equipment hangers.
E. Install cable tray level and straight.
F. Provide all hardware, accessories, fasteners, anchors, threaded rods and support channels required to provide a complete cable tray system.
G. Cable trays shall not be used to house both low voltage and power cables unless cables are separated by a grounded physical barrier.
H. Cable tray system shall be grounded in accordance with ANSI/TIA-607-B.

11.06 CABLE HANGERS

A. Installation and configuration shall conform to the requirements of ANSI/TIA-568-C.0, ANSI/TIA-568-C.1 & ANSI/TIA-569-B, NFPA 70 (National Electrical Code), applicable local codes, and to the manufacturer's installation instructions.
B. Install cables using techniques, practices, and methods that are consistent with Category 6 or higher requirements and that supports Category 6 or higher performance of completed and linked signal paths, end to end.
C. Install cables without damaging conductors, shield, or jacket.
D. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer.
E. Pull cables without exceeding cable manufacturer's recommended pulling tensions. Use pulling means that will not damage media.
F. Do not exceed load ratings specified by manufacturer.
G. Adjustable non-continuous support sling shall have a static load limit of 100 lbs.
H. To avoid electromagnetic interference (EMI), pathways shall provide minimum clearances of four feet from motors or transformers, one foot from conduit and cables used for electrical power distribution, and five inches from fluorescent lighting. Pathways shall cross perpendicular to fluorescent lighting and electrical power cables or conduits.

PART 12 – GROUNDING AND BONDING

12.01 APPROVED PRODUCTS

A. Approved Grounding Lug Manufacturer(s)

1. Harger
   a) 2 Hole Compression Lugs Part #GECLB62A
2. Hoffman
   a) 2 Hole Compression Lugs Part #DGCL61
3. Or Approved Equal

B. Approved Grounding Busbar Manufactures(s)

1. Harger
   a) Wall Mount TMGB Ground Bar Part #GBI14412TMGB
   b) Wall Mount TGB Ground Bar Part #GBI14212TGB
   c) Rack Mount Ground Bar Part #RGBHKIT14119.25
2. Hoffman
3. Or Approved Equal

C. Approved OSP Cable Shield Bond Connector Manufacturer(s)

1. 3M
   a) Shield Bond Connector Part #4460-S
2. Or Approved Equal

12.02 GROUNDING CONDUCTORS

A. Grounding Conductor

1. Construction shall be Type THHN copper conductors, insulated with heat and moisture resistant PVC over which a UL listed jacket is applied.
2. Jacket color shall be green.

12.03 GROUNDING LUGS

A. Grounding Lugs and Hardware

1. Grounding lugs shall be 2-hole compression type irreversible. Stainless steel bolts and washers shall be used to install lugs to equipment and grounding bus bars.

12.04 GROUNDING BUSBARS

A. Grounding Busbar

1. The grounding busbar shall be made of 1/4" thick solid copper.
2. The grounding busbar shall be installed with minimum clearance, 1" offsets and 1-1/2" insulators.
3. The grounding busbar shall accommodate 2-hole compression lugs.
4. The grounding busbar shall meet or exceed ANSI/TIA-607-B requirements.

12.05 GROUNDING

A. The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all communications cable shields, equipment, racks,

cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be installed independent of the building's electrical and building ground and shall be designed in accordance with the recommendations contained in the ANSI/TIA-607-B Telecommunications Bonding and Ground Standard.

B. The main entrance facility/equipment room (EF/ER or MDF) in each building shall be equipped with a telecommunications main grounding busbar (TMGB). Each telecommunications room (TR or IDF) shall be provided with a telecommunications ground busbar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility.

C. All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the EF, ER, or TR shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression lugs.

D. All wires used for communications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with green tape. All cables and busbars shall be identified and labeled in accordance with the ANSI/TIA-606-A.

PART 13 - LABELING

13.01 LABELING REQUIREMENTS

A. Labeling shall be done in accordance with the recommendations made in the ANSI/TIA-606-A document, manufacturer's recommendations and best industry practices.

B. All spaces, pathways, outlets, cables, termination hardware, grounding system and equipment shall be labeled with machine-generated labels.

C. All labels shall be clear with black text.

D. All cables shall be labeled with machine generated, wrap around labels. Handwritten labels will not be accepted.

E. A total of three (3) labels per horizontal cable are required at the following intervals: 6" from outlet; 18" from outlet' 12" from termination block/patch panel.

F. Labeling scheme shall be alphanumeric. Verify labeling scheme requirements with Owner prior to installation.

PART 14 – INTERCOM IP SPEAKERS

14.01 IP SPEAKERS

A. Provide IP speakers and call stations as called out on drawings.

B. Program IP speakers to function with the campus Ambit Intercom system

C. Provide CAT 6 cabling as required to connect the speakers and call stations.

D. Certify all the intercom work and proper tie into the Monroe County system wide intercom system.

PART 15 - TESTING

15.01 TESTING REQUIREMENTS

E. General

1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA-568-C.0, ANSI/TIA-568-C.1 and/or

ANSI/TIA-1152. All conductors/strands of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors/strands in all cables installed.

F. Copper Testing

1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category 6 performance. Horizontal balanced twisted pair cabling shall be tested using a level IIe, III, or IV test unit for category 6 performance compliance.
2. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by the test unit and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
3. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA-568-C.2 Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

G. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end-to-end system. There shall be no splices unless clearly defined in the RFP and/or Drawings. These tests also include continuity checking of each fiber.

2. Fiber

A. Test the optical fiber cable bi-directionally with an OTDR and uni-directionally with a power meter/light source. Fiber must be tested at both 850nm and 1300nm. Maximum attenuation dB/Km @ 850nm/1300nm shall be 3.5/1.5. Maximum attenuation per connector pair shall be .75 dB. Attenuation testing shall be performed with a stable launch condition using a one-meter or two-meter jumper, equipped with an built in Encircled Flux module provided by the test equipment manufacture, to attach the light source to the cable plant. The Encircled Flux jumper assembly shall remain connected to the light source after calibration and during all test measurements. Test set-up and performance shall be conducted in accordance with ANSI/TIA-568-C.3, TIA-TSB-4979 and to the manufacturer's application guides.

B. All fiber optic stands shall be tested utilizing the “Method B” one jumper reference.

H. Test Results

1. Test documentation shall be provided on disk as part of the as-built package. The disk shall be clearly marked on the outside front cover with the words

"Project Test Documentation," the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair (or strand) and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle will be required on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

2. The field test equipment shall meet the requirements of ANSI/TIA-568-C.2, ANSI/TIA-568-C.3, and/or ANSI/TIA-1152.
3. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. Alternately, the Contractor may furnish this information in electronic form (CD). These CDs shall contain the electronic equivalent of the test results as defined by the Specification and be of a format readable from Microsoft Word.
4. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

PART 16 – DOCUMENTATION, AS-BUILTS, TRAINING AND RECORDS

16.01 DOCUMENTATION & AS-BUILTS

A. As-Built record documentation for communications work shall include:

1. Cable routing and identification
2. System function diagrams
3. Manufacturers' description literature for equipment
4. Connection and programming schedules as appropriate
5. Equipment material list including quantities
6. Spare parts list with quantities if required.
7. Details not on original Contract Documents
8. Test results
9. Warranties
10. Release of liens

B. The Contractor shall provide and maintain at the site a set of prints which shall accurately show the actual installation of all work under this section, indicating any variation from contract drawings, including changes in pathways, sizes, locations and dimensions. All changes shall be clearly and completely indicated as the work progresses.

C. Progress prints shall be available for inspection by the Owner or any of his representatives and may be used to determine the progress of communications infrastructure work.

D. At the completion of the work, prepare a new set of as-built drawings, of the work as actually noted on the marked-up prints, including the dimensioned location of all pathways.

E. Furnish as-built drawings and documentation to the Project Manager. As-built drawings shall be generated in AutoCad 2006 or later and Visio formats. Submit as-built drawings electronically on C.D. and hard copy.

16.02 OPERATIONS AND MAINTENANCE MANUAL

A. After completion of the work, the Contractor shall furnish and deliver to the Engineer three (3) copies of a complete Operations & Maintenance Manual. A system wiring diagram shall be furnished for each separate system.

B. The manual shall be subdivided into separate sections with tab dividers to identify subsystems of the integrated system. Reference appropriate Specification sections.

C. Provide the following additional information for each electronic system. Information shall be edited for this project where applicable.

1. Point-to-point diagrams, cabling diagrams, construction details and cabling labeling details

16.03 TRAINING

A. The Contractor shall be responsible for training of facility personnel. Training shall take place after occupancy and before acceptance and shall include programs for on-site operations and maintenance of technology and communications systems. Training shall be held at the Owner's site and shall be of sufficient duration and depth to ensure that the trained personnel can operate the installed systems and can perform usual and customary maintenance actions.

16.04 WARRANTY

A. General

1. All equipment is to be new and warranted free of faulty workmanship and damage.
2. Replacement of defective equipment and materials and repair of faulty workmanship within 24 hours of notification, except emergency conditions (system failures), which must be placed back in service within eight (8) hours of notification, all at no cost to the Owner.
3. The minimum warranty provisions specified shall not diminish the terms of individual equipment manufacturer's warranties.

B. Voice & Data Structured Cabling

1. Manufacturer(s) shall provide a minimum 25-year warranty for components used in the installed Structured Cabling System. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.
2. Contractor shall provide a 1-year material, labor and workmanship warranty on all products installed under this contract against any defects. Defective and/or improperly installed products shall be replaced and/or correctly installed at no cost to the Owner.

END OF SECTION